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EDITORIAL NOTES—GAS, &c.

Publicity—The British Commercial Gas Association.

A DEVELOPMENT of the highest importance to the British gas industry has been introduced to the contributors to the Gas Publicity and Special Purposes Fund by the issue yesterday afternoon of a circular-letter, by the President of the Institution of Gas Engineers (Mr. Robert G. Shadbolt), together with the scheme for the constitution of an Association—under the style of "The British Commercial Gas "Association"—to administer the fund, and to supply the necessary active body and machinery for prosecuting work in the interests of the gas industry's commercial welfare. The scheme will be formally submitted for ratification at the conference which has been convened for Thursday, Oct. 12, at 3 o'clock, within the hospitable walls of the Institution of Mechanical Engineers; and in view of this new development, it is hoped—and we feel certain the hope will be abundantly fulfilled—that every undertaking contributing to the fund will send its representatives, and that others in the gas industry who may be sympathetically inclined, though not yet contributors, will also make application for the admission tickets required in accordance with the intimation conveyed in the President's letter, which is reproduced on p. 19.

Another request is that any suggestions that contributors to the fund may desire to make regarding the scheme for creating the administering body, may be forwarded so as to be received by next Monday—for consideration before the conference by the Committee who have been carrying on the preliminary organizing work. This will facilitate the conduct of the proceedings at the conference, and will obviate fresh ideas being sprung upon those present that cannot be dealt with without due deliberation. But in connection with this matter may we say—though not for the purpose of smothering any useful idea—that the Committee and their legal and other advisers have given most careful thought to the whole question of the constitution of this new body, and to the proposed governing rules. The fact is plainly written in the scheme before us; and it discloses at the same time the further fact that, while the Committee have been hard at work accumulating the fund—though the fund is a long way yet from having the whole support of the gas industry—they have not been idle in other directions, and have succeeded in producing a scheme which, we are persuaded, if conducted rightly and diligently, will have a tremendous influence upon the future commercial interests of the industry. Verily we believe that had the publicity movement started with a vertebrate proposal of this kind in the first instance, the difficulty that has been experienced in obtaining the adhesion of gas undertakings to the Publicity and Special Purposes Fund would have been greatly lessened.

The whole scheme, in our opinion, will appeal favourably to the gas industry. The title of the proposed organization —The British Commercial Gas Association—is good. The general terms of the constitution seem to us to be such as will meet with universal approval. The constitution likewise of the General Committee and of the Executive Committee, who will represent the driving gear that will set the machinery to work and control it, appears to have been well considered. In every direction, it is manifest there has been an attempt, and we trust it will be found that the attempt has been successful, to provide for proper representation (this will be largely in the hands of the contributors themselves) for the whole of the interests of the industry. The organization will cover a multitude of commercial objects. It will fill a place that the Institution of Gas Engineers *per se* could not, as at present constituted, properly and (we fancy) legally occupy; but that it will satisfy the whole of the shortcomings of the Institution as the central organization of the industry is a matter it is inopportune to discuss in this connection.

In the statement of the objects of the new organization that will, it is hoped, be formally launched on the 12th inst., the very first one stands out with the prominence that simplicity and directness of phrase often give: "To Promote "the Commercial Prosperity of the Gas Industry by Co-"operative Action." In an industry, internally non-competitive in its staple commodity, that one definite object should alone have powerful effect in supplementing the forces of the new organization. That is the inscription that will remain supreme on the banner of the Association so long—and we trust its years will be many and useful—as it lasts. The remainder of the statement of objects shows how it is proposed that the capital one shall be carried out. The Association, it will be seen, is to be an active force in the commercial life of the industry in more ways than the mere one of advertising. A good many people in the gas industry have got the notion that ordinary advertising is to be the Alpha and Omega of the purposes of the fund. A greater mistake was never made. The statement of the objects will dispel the notion. Foreshadowed is educational and co-operative effort in other ways—through specially and popularly written articles, exhibitions, lectures, demonstrations, meetings, and conferences. The objects have been pushed forward to providing facilities for the interchange of information and ideas, to develop and improve the commercial methods of those engaged in the gas industry by the facilities thus provided, and to defend the industry from any unjust attack upon it. The organization, in fine, is one that will produce commercial power through the co-operation of the industry's technical and commercial brains.

Enough has been said to show the importance of the new organization to which the Publicity and Special Purposes Fund is giving birth. The machinery is good; its proper operation in future is what is required to produce the intended effects. Provision has yet to be made for this proper operation. On all grounds, in the organization and in its future, we have the inducement for a full and enthusiastic conference on the 12th inst. So let it be.

There is one word of acknowledgment to make, in connection with the desire that more of the gas undertakings of the United Kingdom should be represented in the ranks of the contributors to the fund. Within the limits of his power, the President of the Institution has not spared himself in getting face to face with his professional colleagues, and employing the eloquence of his tongue in urging them to make further effort to incite at home interest in the movement. There has not been a single meeting of professional gas men held since he entered upon his presidency, at which Mr. Shadbolt has not been present, and put forward the claims, in open meeting or privately, of the Publicity and Special Purposes Fund. Ireland, Scotland, and Wales were not too distant for him. He has gladly undertaken the long journeys; and we hope his energy will be duly rewarded.

Some Instructive Experiences and Views.

THE work of the chief officer of an undertaking of comparatively moderate size does not by any means constitute "a bed of roses" in these times when one has to be alert, in many ways, from morning to night, and take upon oneself solely the responsibilities that are, in the larger undertakings, as it were, departmentalized, with a head in each department accountable to the chief. Manufacture, management, and trading (keeping at the same time a sharp eye on the competitors) all devolve upon the chief official of the smaller undertakings; and we admire the men who, under such circumstances, realize splendid successes year after year. They show ability of polyhedral character. If the engineers and the managers of the larger gas undertakings desire to read a chapter composed of incidents and experiences of an active Manager of such an undertaking, we commend to them the Presidential Address that Mr. F. M.

Paternoster, of Felixstowe, delivered at the meeting of the Eastern Counties Gas Managers' Association last Friday. Interest runs through its full length.

The chief and responsible officer of a small undertaking must, within the limits of his province, be an astute diplomatist and statesman; and one of his first cares must be for those employed under him. The President has profound feelings on this subject. He recognizes that the gas industry has more to fear from the labour outside its gates than the labour within; he recognizes all the advantages, too, that labour possesses in an industry so regular in its operations as that of the one in which he has himself grown up. But, withal, he urges constant endeavour to ensure that the men shall work under the best possible conditions, and have every possible and reasonable facility to enable them to perform their duties. We know that there are among workmen those of a grasping nature; the more they have, the more they want. That is a condition which is not peculiar to their kind. But if we take the workers individually, there is to be found a large—a very large—proportion among them whose commonsense tells them that, even in rewards and privileges, there are reasonable limits in all branches of work; and if the employer shows himself a just master in the matter of pay or reward, and takes a live interest in the conditions of his employees, he must cultivate a friendship that at all times, and at certain awkward times more than others, will serve him well. Human interest and diplomatic prevision are in the gas man who (like the President) desires that such movements as co-partnership and superannuation funds could be extended to all gas-workers. But we are afraid, while systems of the kind may (and do) make gas employees feel that there is no need for such schemes as national insurance, without proper arrangement is made for exemption, that, under present circumstances, when everything that ingenuity can devise is being done to crowd as many edifices as possible on the Socialistic foundation, the feeling of a section of well-provisioned workers counts for very little. Gas undertakings, at the present time, are being offered, where sick and such-like funds are in operation, and where the benefits are equivalent to those under the national insurance scheme, conditional opportunity of recognition as approved Societies. But in how many cases can such recognition be claimed under the terms suggested? For the greater number, there are no present means in the national scheme of escape from placing the workers in a worse position than at present, and at a greater cost to them and their employers, unless some such plan as that suggested by Mr. F. W. Cross, of starting a National Gas-Workers' Mutual Provident Society, could be instituted and accepted. The doctrine of the mutuality of interest in the gas industry has been preached unremittingly by leaders during the past generation and more; and in the Gas Publicity Scheme we see the tenets materialized as they have never been before. In Mr. Cross's suggestion, there may, on close examination, be found the means of further and beneficially materializing that mutuality. But the idea means something of a vast and, on first blush, intricate order, which requires thorough investigation before positively signifying one's adherence to it.

Turning to the section of the address treating of manufacturing topics, we know how well Mr. Paternoster has succeeded as a carbonizer with his horizontal retorts. With him gas make, fuel account, and all else are in the front rank; and we can agree with him that the days of the horizontal system are far from being numbered. But he makes this remark: "I do not feel satisfied that the vertical retort "is suitable for small works." We should dearly like to know the reasoning that prompts the President's feeling in this connection, because, after carefully watching developments, and trial plants, we are inclining very much to the opinion that it may be found, within a lower limit, that, where the smallness of the works will not permit of economical operation by power machinery and horizontals, the vertical retort is going to prove its friendly adaptability to those small circumstances. The case that the President puts forward for the application of a blue water-gas plant to his conditions is an excellent one; and the hints drawn from his experience as to the mode of operation in the matter of admixture are valuable. The blue water gas is admitted at the foul main; and found in the Felixstowe working is the essential point that the temperature of the water gas must at that stage be equal to that of the coal gas. We do not see that Mr. Paternoster mentions the calorific power of his coal gas. But if—with a make of 11,532 feet of 15-candle gas from Durham unscreened coal, using as may be required anything between 10 and 15 to 18 per cent. of blue water gas, and the small quantities of benzol mentioned for enrichment—he can supply gas of 510 B.Th.U. net, he is doing exceedingly well. Over three months' tests, we notice that the maximum calorific value (using 11·63 per cent. of blue water gas) was 553·8 B.Th.U. net; and when a minimum calorific power of 489·1 B.Th.U. net was being supplied, 18·56 per cent. of blue water gas was being introduced. During the test an average of 0·0675 gallon of benzol was being used per 1000 cubic feet of gas. We know of certain companies, making coal gas only in horizontal retorts, who are not doing so well as this in the matter of calorific power. Therefore it would be of interest if Mr. Paternoster would state both the gross and the net figures (separately) for his coal gas and blue water gas, and the gross ones from which were derived the net calorific power figures quoted here for the mixed gas.

We come to yet another interesting part of the address, where the President refers to the deposits in his hydraulic main, liquor pumps, &c. The analyses of his artesian well water and of the deposits appear to point conclusively to the source of his greatest trouble in the matter of these deposits. The water is a very hard one; and the analysis of the sample of deposit from the hydraulic main shows that it consists essentially of calcium carbonate, associated with much tarry matter. We assume that the liquor-pump from the suction-pipe of which the other sample of deposit was taken, is the one used for pumping liquor to the hydraulic main. If this is so, the analyses suggest that it is the heat of the hydraulic main that throws down there the calcium carbonate contained in the artesian well water. We get iron oxide traces in the sample from the suction-pipe, and iron oxide and alumina traces in the sample from the hydraulic main. The iron oxide is no doubt due to the rust of the pipes through which the water passes. The analyses of the water and the deposit samples would seem to indicate that what Mr. Paternoster really wants, if he has any considerable trouble, is a small water-softening plant as an adjunct to his artesian well supply.

For the rest, the address is strongly commercial. There are wise views on the importance of encouraging and not discouraging the home market for residuals, by cultivating not only coke and tar but sulphate of ammonia sales in small quantities. Mr. Paternoster finds there is business in this direction that it is folly to reject as too insignificant. He also has some soundly practical remarks to make on the question of tar-surfacing of roads—again urging that gas undertakings should err on the side of a liberal treatment of road authorities rather than exact the last farthing per gallon for the tar. Further, he points to the experience at Felixstowe with crude tar, as showing as excellent effect and wearing power as the use in a neighbouring area of a tar specially prepared to comply with a stringent specification. There is a tendency in some quarters to a little too much exaction as to quality; on the other hand, experience at Felixstowe and neighbourhood must not be taken as having general application without qualification. The character of the road surfaces has a right to consideration in the matter of the most suitably conditioned tar. There are also some piquant paragraphs and passages in the address regarding local electrical competition. Whether the competitors that the President has to meet will mend their ways after these "disclosures" we cannot say; but certainly they will not like the plain speaking as to their tactics, nor the clear showing that is made in the address of the strong position enjoyed by the gas industry for meeting competition, by means that have real intrinsic merit.

To-Day and To-Morrow.

THE interests lying currently uppermost in men's minds are frequently discoverable through their utterances and writings. In the thoughtful address with which Mr. E. H. Swain, of Pontypridd, inaugurated his year of office as President of the Welsh Association, one traces a spontaneous and not laboured presentment of the interests that, in his capacity as a member of the gas profession, he has prominent at present in his mind. Situated as he is in South Wales, where there has been so long and ugly a cleavage between Capital and Labour, where Anarchy has gone to lengths that have raised indignation throughout the country, it is only natural that Mr. Swain should ponder over what he has had under his immediate eye in its relation to possible effects

on the gas industry. The newer tendency of socialistically-controlled trades unionism is, as he puts it, to widen the area of conflict in labour disputes; and herein is one of the gravest perils that menace the country. When we see a large strike engineered, and misery and riot rampant and trade impeded, simply because a trade unionist or two connected with transport refuse, and their refusal brings in the name of discipline merited dismissal, to deal with the goods of a firm at which the employees (associated with another union) had struck, that is a significant sign of the lengths to which, under the new order of socialist-labour combinations, it is intended to carry conflict in order to make labour predominant. And when we hear of attempts being made to create a central trade union organization to which all trade unions should be affiliated, with the definite object of commanding compliance with request by the force and peril of a universal labour strike, it is time to begin to consider as to whether the Legislature of the country has not power to place restrictions on conspiracies—for such these projects are—against the national weal.

It is not the participants only who suffer under a strike in a single industry. The effects are spread wide afield; and, under the trade union drift in aggressiveness and militancy of the times, the effects are enlarging in a most ominous and mischievous manner. This is a tendency that, by some means or other, must be stopped, if results infinitely more serious than those incurred up to the present are not to be violently forced upon the country. The President selects an illustration that hits home when he refers to the gas industry at the time of the great railway strike—brought about by grievances, real or supposititious, in which the gas industry was not in the slightest concerned. Then there were hundreds of gas managers in the country who looked carefully and earnestly at the size of the stock that stood as the protection between them and collapse. Imagine what would have happened in several places had communication between coal-pits and gas-works been practically barred for a number of weeks (as might be the case under a universal strike). Gas-works could not go on without raw material; and the gas-works men would be thrown idle. Worse than that, the stoppage of the means of lighting would commit every town where it occurred to disorder and felony, and would bring untold miseries on the inhabitants. This is only one direction in which evil effects would succeed the application, for any prolonged period, of the malignant policy and principles of the new socialistically-controlled trades unionism. It is a national menace; and as such it ought to be dealt with. "Thus far, but no farther, may you go" ought to be, in this matter, the edict of the British Legislature.

Being centred in the midst of the protracted trouble in South Wales, Mr. Swain has been prompted to give this subject broad view and thought. From that subject he struck straight to the internal affairs of the gas industry. As we have said before, the industry's greatest enemies are not internal ones (as is so much the case in many other industries), but they are mainly external. So far as internal conditions go (other than where there are obstructionists on Boards or Committees), everything can be viewed in the most optimistic spirit. But for full value to be secured to-day from opportunity, there are amendments that it is necessary to make; and the President realizes it, equally with his brother President of the North British Association. The value of the central and district organizations of the industry, and of the commercial sections, is so unchallengeable that to remark the fact almost constitutes folly. But it is manifest that the President cannot see why a constitution and a method of procedure which have practically in most respects existed for nearly half a century should not require revision while all else in which the organization is concerned has undergone change, and fundamental change. We had the President of the North British Association suggesting the other week that if all else failed to set in motion the machinery needed to obtain a central organization worthy of the industry and its vast work, the District Associations should take the matter in hand, and persist in agitating it. Now we have Mr. Swain suggesting that should at any time examination show that revision is essential, the necessary driving force will be found in the various District Gas Association Commercial Sections, where preliminary conference can take place, and stimulation be given to the idea. There is no doubt in our mind that the seed is being sown, and is taking root, that will eventually carry this matter to a definite head.

There is a broad and well-expressed philosophy underlying the trend of thought in this address. The President speaks of the progressive spirit abroad among the workers of the industry, and of the remarkable development that there has been in the industry, technically and commercially. We reflect upon this with great satisfaction; but do we give sufficient thought to the development possibilities of the future? It is feared all do not. Those who look contentedly upon the present, and not beyond, are much like some of our competitors who take an almost fiendish delight in talking of the gas industry having reached the end of its tether. We are, however, reminded by the President that what are the gas practices of to-day were, in many a gas man's mind, the fancied impossibilities of yesterday. The lesson of the immediate past decades of the gas industry is one to be heeded in contemplating the future and its developments. We cannot say what these developments will be. But we are warned by the past not to consider impossibilities, and are encouraged to give to development a reasonably broad view. When this has been given, it will be readily seen that, if there is anything about our industry that is not sufficient for to-day's circumstances, then certain it is that, as each year passes, unless there is the necessary change, it will become still more insufficient. The technical position is settling down by the aid of time and experience; but the commercial part requires a central organization to watch over its interests as much as the technical part. We hear voices say "More so," and are disposed to agree. The work to be taken up by the Publicity Committee is only part of what requires to be done, and to be done well, by the central organization of the industry, in a systematic and persistent way, and still without trespass upon the endeavours—the necessary endeavours—of the gas undertakings individually. On the subject of publicity, there is just one little matter in the address that should be set right. Very seldom indeed, said the President, does one see the advertisement pages of the Press troubled with the paid matter of the gas authority. That may possibly be the experience in South Wales; but it certainly is not the experience in many and large parts of England. Altogether, the address is, rightly, one of satisfaction with industrial position; but it holds out the view that contentment to-day must not allow those largely responsible for the fortunes of the industry to take no thought for the morrow. By taking thought for the morrow, many things are seen in a new light.

High-Pressure Parade Lighting during a Decade.

No dispute will arise as to the credit due to the Ilford Gas Company for their pioneer work in connection with the system of parade or scale lighting by means of high-pressure lamps. They, though not a Company of large opportunities, originally trod in this matter a path along which they had no lead, and they had to make their own experience to guide them as to the proper course to pursue. The Company started this work a full decade ago; while some other and (in magnitude) more powerful concerns are still considering whether they shall leave outside shop lighting to be taken over by electricity suppliers, with at their own hand a system that conquers practically all along the line whereever it is introduced. The paper that Mr. W. B. Farquhar, the Engineer and Manager of the Ilford Company, read at the meeting of the Eastern Counties Association on Friday—in which he describes the inception and development of the system at Ilford, and the competition it has had to meet, and has met successfully, and in which he gives further the scales of charges for lamps according to the number of hours' use per annum—will be studied very carefully, and more especially by those responsible for the management of undertakings of moderate size.

Mr. Farquhar has a message for such concerns. It is that high-pressure gas supply for this purpose has such flexibility that it places commercial power in the hands of undertakings of any size. It is remarkable how largely the view obtains and persists among the managers of some of the small undertakings that new developments are beyond their reach and circumstances. Without discussing on this occasion whether or not this will apply to developments in other directions, it may with confidence be said that to this one it will not. Ilford, under their conditions as explained in the paper, can afford to supply shopkeepers with upwards of 800 hours' lighting per 1000-candle power lamp per year for £4, and per 600-candle power lamp for £3, relieving the customer of all other cost or labour, even in the matter of lighting and extinguishing. Taking the round number of

800 hours, the charge per 1000-candle power lamp only works out to 1·2d. per lighting hour; while the 600-candle power lamp is down to 0·9d. per lighting hour. There is 5 per cent. discount allowed on accounts when paid within two months of quarter day. The tariffs of the Electricity Department are very ingeniously based on 500 hours' lighting, with a charge per hour's use beyond this. The shopkeepers have learned that the financial result (without speaking of any other), in contrast with what the Gas Company have to offer, is not to their advantage. This is seen by the very useful set of tables supplied by Mr. Farquhar, in which are shown the allowances made for less hours of high pressure lighting than the standard—the figures plainly exhibiting the fact that 500 hours' lighting under the Gas Company's scheme is cheaper than under that of the Electricity Department. High-pressure gas has produced economy in the cost of lighting, and so has experience. Experience, too, has revealed how maintenance economies are to be secured; and to these Mr. Farquhar points in his serviceable paper.

Woodall-Duckham Vertical Retorts for Hull.

The British Gaslight Company carry on operations at centres in distinct quarters of the country; but nevertheless the tale of success from each of the important stations last half year has a strong family likeness. It was the pleasure of the Chairman (Mr. J. Horsley Palmer), at the meeting of the proprietors last Wednesday, to report upon reductions made in the price of gas and to be made, and, where they have already lately been made, upon the responsiveness of the gas business. But the chief point of technical interest in the Chairman's address was the statement as to the extension of the works that their Engineer and Manager at Hull (Mr. John Young) is making. The carbonizing plant that he has selected is to be on the Woodall-Duckham continuous system; and we learn that the installation to be at once undertaken will consist of eight settings of four retorts, which will have a total producing output per twenty-four hours of upwards of 1,900,000 cubic feet. The installation will enable Mr. Young to keep thorough records of its operation, as it is to have its own separate system of condensing, washing, and purifying plant.

Who are the True Philanthropists?

It is only natural, at the present time, that in the course of meetings of shareholders in great commercial undertakings labour questions should receive some consideration. In many cases the proportion of profit in relation to the capital employed and the wages paid is such that any additional financial burden may be a serious matter for the proprietors. It was pointed out, for instance, by Mr. J. S. Harmood Banner, M.P., when presiding at the annual meeting of shareholders, that Pearson and Knowles Coal and Iron Company, Limited, employ in all their departments 9447 men; the annual wages bill being £631,180. On the other hand, the number of shareholders in the Company is 1161; and the dividend distributed this year, both on the preference and ordinary shares, is £39,086—the ordinary shareholders receiving £24,400 of this. All other profits are required for the maintenance of the Company's property and the necessary extensions to keep it in a high state of efficiency. Pointing out these facts, and referring to the labour question, the Chairman asked who were the greatest philanthropists to the working classes—politicians, among whom must be classified all His Majesty's Ministers, most of whom had never done a day's manufacturing or trading in their lives, and were merely professors of theories or amateurs; the benevolent man who gave a donation to a soup kitchen when a strike was on; or the investors in a company like theirs, trusting their money to labour, and finding maintenance and livelihood for 9447 men and their families? Put in this plain, straightforward way, the question seems an easy one to answer. This particular undertaking pays Imperial and local taxes amounting together to nearly £24,000; but notwithstanding this big contribution, the Chairman complains that at present no reliance can be placed on the duty of the Government to help them if difficulties arise. "Are we," he added, "entitled to the protection of the State, to be free (ourselves and our men) to carry on business without let or hindrance, without injury to person or property, or have we forfeited protection and the rights to our liberty?" One would think this query as easy to answer as the other, if the facts are taken calmly into consideration. It is unfortunate that employers should be forced into the position of having to put forward such a question.

Handicapping Capital.

These matters are, of course, in the long run of quite as much importance—or even more—to the workers as to the shareholders; but the probable results of the present tendency of affairs have been still more closely brought to the attention of the employees of the Broomhill Collieries, Limited, by some remarks made by Lord Furness, when occupying the chair at the recent shareholders' meeting. The past year's results have been unfavourable; and this result was stated to be due to the largely increased cost of labour. The gravity of the position from the proprietors' point of view is increased by the fact that further burdens on the industry are threatened. There is the National Insurance Bill, the new Mines Bill, and the claim for a minimum wage—all of which would entail heavy further expenditure on the undertaking. But the *crux* of the position seems to be the question of three shifts *versus* two; and it was in this connection that the Chairman made a statement that should convince even the most ardent of Trade Unionists that there are limits to the extent to which capital can be squeezed. Speaking for himself and for his colleagues on the Board, Lord Furness announced that the moment the three-shift system was abolished, the Company would be unable to work their collieries, and they proposed to at once close them down. This, he made it clear, was not put forward as a threat, but was merely a plain statement of the necessities of the position, arrived at after mature consideration. The Manager has estimated that the substitution at the Broomhill Collieries of two for three shifts would entail a loss of £30,000 to £40,000 per annum. Facts are stubborn things; and there is one here that the colliery workers have evidently got to face. One can only hope they will be able to do so before they lose their employment. Any enthusiasts who may feel inclined to deny that Labour is dependent upon Capital, will find in the case of the Broomhill Collieries—where the limit of endurance has been almost reached—a very hard "nut to crack." In spite of any amount of artificial manipulation, there is no doubt that, as Lord Furness says, the man with labour to dispose of will have at last to realize that in the long run it must find its own level in the markets of the world.

Railway Companies and Profit-Sharing.

Interest in the subject of profit-sharing as a means towards the solution of the labour troubles in the railway world would seem to be growing. Last week the "Railway News" published a suggestive article, in which the means of carrying out a scheme of profit-sharing were elaborated in some detail. In its leading idea, the plan does not differ from that which has been applied with so much success to many of the leading gas undertakings. It starts with the assumption that, out of the revenue of the year, provision shall be made for the working expenses, and such prior charges as dividends on the debentures and the preference and guaranteed stock. Out of the surplus then remaining, it is suggested that the ordinary stock should receive interest at a rate equal to the average annual rate of dividend paid upon such stock for the three years, with a maximum of 5 per cent. The balance now remaining would be the profit fund, which is to be the subject of division or sharing. As to the basis of division, the suggestion is that capital and labour should share in proportions which the interest on the paid-up capital of the company bears to the wages of the participating members of the staff. This would by no means work out to the same result in all companies. In the case of the London and North-Western Company, on the basis of the last year's accounts, the profit fund, after paying the suggested interest of 5 per cent. on the ordinary stock, would amount to £897,093. Of this £563,416 would be the Company's share, and £333,677 the share of the employees. This would permit of the distribution of a sum equal to 15s. 7d. per annum on the ordinary stock, and would give the workmen £11 6s. 9d. per cent. on their wages. Similar, but not so financially good, results would be achieved on some of the other lines. When the less prosperous ones are reached, the shareable amount necessarily becomes less. The Great Eastern, for example, would only be able to share at the rate of £2 15s. 8d. per cent. among the men. In all cases, the profit fund would be provided at the expense of the holders of ordinary stock; so that unless the profit-sharing resulted in the exercise of economies by the men who would participate, the stockholders would stand to lose. Profit-sharing schemes cannot, however, be put into operation without money; and it would probably be found the sacrifice was not too great to make in the

cause of peace. A more difficult matter is that of the companies who cannot pay full dividends on their preference stock, and, of course, have nothing for the ordinary stockholders. No precise proposal for meeting this difficulty is made; but it is suggested that a system of dividing the railway companies into three or four classes might permit of modifications of the scheme so as to suit each one.

THE LATE MR. ROBERT MORTON.

An Appreciation by Mr. Corbet Woodall.

ADDITIONAL to the references to the work of the late Mr. Robert Morton which have already appeared in the pages of the "JOURNAL," the following kindly expressed appreciation by Mr. Corbet Woodall will be read with interest.

As it was my fortune through a period extending over half-a-century to be associated with the late Mr. Robert Morton, and to enjoy his friendship, I readily respond to your invitation to send a few words expressive of the affectionate appreciation in which I hold his memory.

I think the occasion of Mr. Morton's first visit to England was the erection for the Durie Foundry Company of some exhausting plant at the Burslem Gas-Works, of which my late brother William was then Manager.

Shortly after the completion of this work he became Manager of the Woolwich Equitable Gas Company; and there he accepted me as a very junior assistant, or apprentice without fee.

He was at that time somewhat reserved, even stern, in his manner to subordinates—an attitude due to the serious views of life and its responsibilities which he himself held, and which he desired to impress upon those about him. He was then, and always, a deeply religious man; his religion in those early days having much of Puritan austerity, which mellowed as the years passed.

About the year 1868 Mr. Morton was appointed Engineer to the Vauxhall station of the Phœnix Gas Company in London. Of the three or four men invited to meet the Directors at that time, I was one. In 1869, he became Chief Engineer to the London Gaslight Company at Nine Elms; and the succession at Vauxhall fell to me.

Among my happiest recollections of our late friend are the weekly meetings (extending over many months) which he, Mr. George Livesey, and I spent at the offices of the Lord's Day Observance Society, with the late Dr. Gritton as Secretary, formulating the scheme for suspending gas-making during the daylight hours of Sunday. We were all much in earnest over the work; to Mr. Morton, it was a mission.

The coincidence was somewhat remarkable that, in these later days, he and his former pupil should at the same time have presided over the two largest Gas Companies in London.

Mr. Morton was as modest as he was capable; anything savouring of self-advertisement was impossible to him.

He was a truly good man—one to seek when a friend was needed; and his memory will remain green with those who knew him so long as life lasts.

C. W.

Chislehurst, Sept. 30, 1911.

PERSONAL.

Mr. SAMUEL SPENCER has just been appointed Warden of the Founders Company—one of the old Guilds of the City of London.

Mr. JAMES HUNT, an inspector in the employ of the Bolton Corporation Water Department, has been presented by his colleagues with a gold watch, chain, and seal, on completing fifty years' service with the undertaking, as a mark of their regard and esteem; and a gold brooch was handed to Mrs. Hunt. Mr. Hunt started as a labourer in the Water Department, and worked his way up to an inspectorship.

Mr. H. E. HARPER, the City Lighting Engineer of Melbourne, has recently been on a visit to this country to inspect the public lighting of large cities, and made a special inspection of the experimental lighting in the City of London. He has also visited Bradford, Derby, Leeds, Liverpool, Sheffield, Edinburgh, and Glasgow, as well as the Metropolitan Boroughs of Marylebone and West Ham. The Lighting Inspector of Paris also visited the City of London during the vacation for the purpose of viewing the lighting.

Last Friday, at the Dewsbury Road Gas Department, Leeds, Mr. SIDNEY HOLE was presented with a fine set of drawing instruments by his colleagues of the City of Leeds Gas Department, on his leaving to take up his new post under the East Hull Gas Company. Mr. R. Halkett, who made the presentation, in a few suitable words, expressed the regret of all in losing Mr. Sidney Hole, and said that everyone wished him success in his new sphere, and hoped the small present would remind him of the commencement of what it was hoped would be a successful career. Mr. Sidney Hole responded, thanking all for their kindness and good wishes. He assured them that the present would always bring back to him the pleasant time he had spent with the Leeds Gas Department.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 61.)

ANOTHER agitated week for the Stock Exchange has come and gone. The opening was most disagreeably disturbed by the Tripoli trouble in replacement of the Moroccan. "*Ex Africâ semper aliquid novi.*" Railways were very shifty—swinging down and up and then down again; the Foreign Market was alarmed; and the rest generally were lower, except Consols, which bore up firmly. Tuesday began in a saddened mood; but later the tone became more cheerful on hopeful views regarding those knotty problems now familiar to all. Government issues were strong. Rails advanced in nearly all lines, and the Foreign Market was quiet and firm. Wednesday was inactive, but took a bright view of things. All markets were firm; Rails being helped by the evident failure of the Irish strike. But Thursday produced a disagreeable change. Grave misgivings were entertained regarding International relations; and a general move downward of prices set in. Consols fell ⅛, Railways were pressed for sale, and Americans swayed about wildly. Friday was much put out by the apparent imminence of active hostilities between Italy and Turkey; and markets drew in their horns. But presently the downward course was arrested, and a reaction set in. Consols, after touching 76 15/16, closed unchanged; and the rest lost but little. Saturday opened with anxiety, seeing that the torch had actually been applied to the pyre of the Peace of Europe; and prices were lowered in preparation for the worst. But when it was seen the Continental bourses were keeping their heads, things became calmer. Consols closed firm at 77-77¼. The Money Market was well supplied to meet Stock Exchange requirements and the close of the quarter. Discount rates were quite firm. Business in the Gas Market was not up to the average in point of activity, and movements, though slight, were not uniform. In Gaslight and Coke issues, the ordinary was comparatively inactive, and the price dropped half-a-point towards the close—transactions ranging from 106½ to 105¾. The secured issues were little dealt in; the preference marking from 101 to 102½, and the debenture 81—a rise of 1. South Metropolitan was much neglected; totalling only three or four dealings at 116½ and 117¼, with prices just as the preceding week. The debenture was done at from 79½ to 80½—a rise of ½. In Commercials, the 4 per cent. changed hands at 111½ and 112—a fall of ½. Among the Suburban and Provincial group, Brentford was the busiest, with dealings at 259 in the old stock, from 198½ to 202 in the new, and at 97½ and 98¼ in the debenture. South Suburban was done at 119. In the Continental companies, Imperial realized from 181¾ free to 183 (a rise of 1), Union preference 136½, and European from 18½ free to 19¼. Among the undertakings of the remoter world, Cape Town was done at 2, Monte Video at 12¾, Oriental at 139¼, Primitiva at from 7⅜ to 7½ (a rise of ⅛), and ditto preference at from 5¼ to 5⅝.

ELECTRICITY SUPPLY MEMORANDA.

Non-Magnetic—Electric Fitting and Abandoned Gas Points—A Question of Responsibility—The Sales Department at Marylebone and Hostile Contractors—Mr. Seabrook's Attempts at Stimulating the Electric-Cooker Business—Another Electrician's Views.

THERE is the Electrical Exhibition at Olympia; the public is outside, and it shows little sign of entering. Last week the show was not fulfilling its mission of attracting and converting the public; and there have been among the exhibitors, the attendants, and in the columns of at least one of our electrical contemporaries, groanings deep and despairing over it. The fact cannot be hidden that the majority of those who have been to Olympia on this occasion are those who are already, through their personal interests, confirmed electrical partizans. Those are not the ones that it is desired to specially capture. The "Electrician" tersely states the truth when it says that "the first week has been wasted;" and it condemns some of the things that have been done, and points to others that have been left undone, with the view of giving magnetic power to the display. The "Electrical Review" is hopeful as to the present week and the succeeding two weeks. It says: "That the non-technical public will be attracted goes without saying; for it has been found over and over again in many large centres of population that an electrical exhibition has about it a subtle fascination that proves irresistible to the layman." Dear "Review!" How great is the pleasure that is derived from its varying shades of optimism and pessimism. The "Electrical Engineer" is jubilant over the show. It remarks: "Without indulging in hyperbole, it may justly be said that the Olympia Exhibition is a triumph for all concerned." And in another column: "The great exhibition . . . may justly be said to have more than fulfilled even the most sanguine hopes of its promoters and organizers." Place this statement alongside the editorial outpourings of the "Electrician," and there is food in the diametrically opposed statements for profound meditation. If we can believe our own eyes, then the "triumph" and "the most sanguine hopes of the promoters and organizers" are not of a high order so far as the public is concerned. There is no use trying to hide the fact that, during the first 25 per cent. of the period of the show—we cannot predict what will happen during the remainder—it has not fulfilled its mission.

There are also some critics of the character of the show. We

expressed, in a special article last week, the view that it was a good one; but the Engineering Correspondent of "The Times" is evidently of a different opinion. He thinks that "a close time for inventors, if it were possible, would be of some considerable advantage to the electrical trade, as what the public hear is far too much of what electricity is going to do, and too little of what it can accomplish. For that reason the comparative scarcity of novelties at Olympia will be welcome in most quarters." The similar view is not, we know, altogether absent in electrical circles. There are things that are said in private that are not bruited from the house tops. The "Electrician" makes some scathing comments upon some of the features of the display—perhaps a bit too much so; but they are the outcome of a righteous indignation over the absence last week of the public. The "Electrical Times" remarks that "it is already too late to make the present Olympia show a model of sweetness and light." However, a band was introduced last week to assist in dispelling the gloom and monotony from which the stand attendants were already beginning to suffer; and perhaps the band and the advertised wonders of electric cooking will, combined, move the public to a greater appreciation of all the good things that, from the electrical point of view, Olympia holds out for it. It is sad for our electrical friends to think that such a vast proportion of the public should be so contented with its present lot in the matter of lighting, cooking, and heating that it can stay away from Olympia.

The writer of "Installation Topics" in the "Electrical Times" is in a quandary. He has been roving about trying to find an answer to this question: If a contractor wires an empty house in which gas was used by the previous tenant, and may be used again for cooking or fires, is it part of his duty to see that the disused gas points are properly stopped off? We should say that it would be the wireman's duty to cap the gas-pipes at every point at which he interfered with them in fitting up a house; otherwise he might find out, a little later on, what is meant by "culpable negligence." Being an empty house, the probability is that the gas will have been turned off at the service cock and the meter removed, or the service-pipe capped off; and the meter would not be replaced, or reconnected, until a demand was made for a supply of gas, when the refixing, and refitting of the place on behalf of the new tenant other than where electric fittings had been installed, would ensure the examination of all points of service that had not been interfered with, or been hidden, by the work of the electrical contractor. The writer in our contemporary does not appear to hold a very high opinion of the views of gas authorities on the question of responsibility or obligation. Speaking of capping off, he says "the tenant knows nothing at all about it; the gas company does not care (for it states clearly that it is not responsible for anything on the consumer's side of the meter); and the wireman says it is not his affair, as gas-fitting is another and despised trade." That is very wrong of the wireman; and certainly the statement is a libel on gas companies. Then, further on, he says that "no electric undertaking would connect-up until the wiring had passed the usual test; but gas concerns seem to trouble but very little." The writer of the quoted lines has, in his ignorance, a very poor opinion of gas suppliers; of course, he does not know of the growing practice by them of obtaining parliamentary powers to make inspection of house installations, and to prescribe for the proper piping of new houses. With the increased applications of gas, gas undertakings have naturally increased their interest in matters on the consumer's side of the meter. In our friend's opinion, too, "the gas company should never connect an installation until a leakage test over a space of several hours has been taken, and every outlet, whether plugged or in service, inspected." Tests can, of course, be made before connecting-up; but if the writer can tell us how a gas undertaking can make a better and more effectual leakage test in a dwelling-house before connecting-up than after, we shall be glad to hear of it. Then there is a little further gratuitous advice to gas undertakings, for which thanks are expressed. Such tests should be the first consideration, it is said, of the supply undertaking; and at every change of tenancy, the test should be repeated before giving a supply. To think of it, that the gas industry, after more than a century's experience, should have to be taught its business by an electrician. It is a common failing of some people to encourage the belief that they are endowed with special faculty for teaching their elders elementary duties.

There is constant trouble between the Sales Department of the Marylebone electricity undertaking and the local contractors—the latter being the aggressive, or rather complaining, party; the former being the one that would desire to be left to go its own way in peace. There is deep rankling among the local contractors that the electric wiring and fittings business in the borough should concentrate itself so largely in and through the Sales Department; and so they are for ever finding reasons for pitching into it, and keeping Mr. Seabrook fairly busy searching for fresh defence. Just recently (Aug. 29, p. 531) it was shown that in the last financial year the department exhibited a net loss or cost of £2212—salaries alone accounting for £4208. This loss has supplied ground for another outburst of antagonism and indignation on the part of the contractors; and a resolution has been passed by them protesting against the continued existence of the department as unnecessary and unfair to the contractors as such, and to them as ratepayers, and objecting to the methods adopted by the department in making use of the information obtained by it as the electricity authority to enter into unfair competition with the private ratepaying traders. That the department is in a more powerful position than the contractors to command wiring and fittings business cannot be gainsaid; but that the department is unnecessary is a matter upon which there may be divided opinion, seeing that—it was a very striking sentence in the last report presented by Mr. Seabrook—"*for quite a month* at the end of *each quarter*, practically the whole of the staff is employed in settling account queries and complaints." What is the Electricity Department to do without the expensive staff of the Sales Department to attend to all these queries and complaints four months in the year? The contractors cannot deal with them, when they refer to grumblings over the accounts, to the supply of energy, and to the general discontent of consumers. However, there is a perfect campaign proceeding in the borough against the department; and under the heading of "Municipal Socialism in Marylebone," the "Marylebone Mercury" is making public the contractors' side of the question. It looks like an earnest fight to the end now; and the Council will find that the contractors have many sympathizers among the public. Mr. Councillor Lewis and Mr. Duncan Watson, the senior partner of Messrs. Duncan Watson and Co., electrical engineers, are the leaders in the campaign. The latter gentleman questions the capacity of the members of the Electricity Committee, however eminent in their own particular spheres of work, for conducting a highly technical undertaking of this kind. They are, he alleges, hopelessly out of touch with electrical matters; and nothing short of an experienced Board of Directors, with financial interest, and inseparably connected with the industry, is required to manage such a concern. Mr. G. Harland Bowden, the President of the Electrical Contractors' Association, has also had some plain words to say on the subject. He attributes the anxiety of the Electricity Department to undertake complete installation in private houses to an insane competition with the Gaslight and Coke Company. The latter, he rightly says, have their vested interests, and have as much right to live as the electric undertaking. That sensible view the Company endorse.

We have had something to say recently regarding Mr. Seabrook's views on the question of electric cooking—views based on a small local experience; but the rosy hue he gives to those views, we have our suspicions, is not altogether justified even by that small local experience, which has been obtained by a most attentive nursing on the part of the Sales Department. In his annual report, he referred to the subject. The work of this section of business, he said, is broadening and extending the use of electricity; and it has made great advance in the period under review. We charge our memory in saying that, at the close of the period to which the report alludes, Mr. Seabrook, or the Sales Department, had fitted seventeen cookers in the district; but he omitted to mention whether all the cookers were in regular use, whether any had been returned, whether any of the users or their servants had had any ground of complaint in regard to them, and whether any of the householders who had electric cookers still retained their gas or coal stoves, and still used the latter for the main part of their cooking. These are points that, of course, Mr. Seabrook did not purposely omit to mention. They must quite accidentally have slipped his memory. Perhaps—he is naturally bold—he has now something in the cooking line of a larger order to produce, as a sort of surprise for both the competitors and the advocates of electric cooking. We should not, for example, be astonished to learn that one or more members of the Council, out of pure sympathy with his efforts in this direction, have indulgently supplied him with opportunity. If so, there will be interest—after a fair period's experience in learning all about it—to hear of the trials and difficulties of the users, and of the work done and the costs of doing it, including the charges made by the Electricity Department for current, and the actual expenses incurred in installation and maintenance. So far, he admits in his report that "a great deal of the work" done in connection with cooking has been quite unremunerative to the Sales Department, but that it has benefited the electricity undertaking as a whole. This is one admission. Another is that the cost of the necessary experiments and of the close attention inevitable to the introduction of the business is debited against the cooking hire scheme, and amounts to "considerably" above the revenue from hire.

One electrician who has been interviewed by the "Marylebone Mercury," has dealt with Mr. Seabrook's magnificent views on this subject of electric cooking; and the householders in, and ratepayers of, the borough have this statement to digest:—

> Now, not only must I admit, although I am closely associated with the electrical industry, that no electric-cooker has been brought to my notice that can in any way compete in running cost (say) with the gas-stove at local gas rates, but I am bound to point out that we have the statement of Professor Perry at the most recent electrical exhibition that an economically competitive electric-stove has yet to be invented. Apart from any possible benefit to the consumer, the electric cooker, particularly in a Metropolitan area, will not benefit the financial position of the electricity supply. An electric cooking-stove is a poor load factor; it consumes current just at those hours when it is produced least economically. If our current was generated by water power, things would be different. Evidence has been given time after time before Parliamentary Committees that demonstrates the fact that it is the "load factor" more than anything else that cheapens the supply of electricity and cuts down the horse power uselessly employed when catering for a fluctuating load.

The publication of an expression of opinion such as this will not help the Sales Department of the electricity undertaking in their efforts to develop the cooking business in the district. But it is well it should be an electrician to undeceive the householders.

PUBLICITY.

CONFERENCE ON OCT. 12—THE BRITISH COMMERCIAL GAS ASSOCIATION—CONSTITUTION AND RULES.

In connection with the Publicity Movement, there was issued yesterday afternoon, from the offices of the Institution of Gas Engineers, by the Secretary (Mr. Walter T. Dunn), the following circular-letter, signed by the President (Mr. R. G. Shadbolt), together with a pamphlet giving the draft of the constitution and rules of a new Association—the British Commercial Gas Association—for administering the Publicity and Special Purposes Fund. This is the first work of the Committee placed in charge of the preliminaries connected with the scheme; and it must, we think, be agreed that this beginning of their organizing labours, beyond the accumulation of funds, is an excellent one. It gives to the fund just the independence and the administrative machinery that are required. The draft constitution and rules show that a great deal of thought and care have been expended upon the work.

Regarding the circular-letter from the President, it is desired to make the conference of Oct. 12 a large and representative one; and the points as to information respecting the number of admission tickets required by contributing gas undertakings, and applications for tickets by those who are not contributors but are interested in the movement, will be particularly noted.

Another important desire of the President is that the draft constitution and rules shall be perused by the representatives of the contributors; and if they have any observations to offer thereon, he asks that, in order to facilitate matters, they may be addressed to him, at the offices of the Institution not later than Monday, the 9th inst. This will enable the Committee to consider the suggestions prior to the meeting on the 12th; and all contributing undertakings we are sure will desire to assist them in this regard, though we do not think there can be much that can be suggested in the way of improvement.

The circular-letter is as follows:

INSTITUTION OF GAS ENGINEERS.

39, *Victoria Street, Westminster, S.W.*
Oct. 2, 1911.

Publicity and Special Purposes Fund.

Dear Sir,—I have pleasure in informing you that arrangements have been made to hold a meeting of supporters of, and others interested in, the Publicity Movement on Thursday, the 12th inst., at three p.m., at the Institution of Mechanical Engineers, Storey's Gate, St. James' Park, Westminster, for the purpose of constituting the Association for administering the fund, and to transact other business incidental thereto.

As the Publicity and Special Purposes Committee are anxious to secure a thoroughly representative attendance, they trust that the undertaking with which you are connected will be fully represented at the meeting.

Will you therefore be so good as to let me know, as soon as possible, how many tickets of admission you wish to be forwarded.

Enclosed will be found draft constitution and rules of the proposed Association which are to be presented at the meeting, and which the representatives of your undertaking are requested to kindly peruse beforehand.

Should they have any observations to offer thereon, it will facilitate matters if the same are addressed to me, as above, *not later than Monday, the 9th inst.*

Yours faithfully,

(Signed) Robert G. Shadbolt, *President.*

[Enclosure.]

THE BRITISH COMMERCIAL GAS ASSOCIATION.

[*Established under the Auspices of the Institution of Gas Engineers*]

CONSTITUTION AND RULES.

1. The office of the Association shall be in London.
2. The objects of the Association shall be:—
   (A) To promote the commercial prosperity of the gas industry by co-operative action.
   (B) To adopt such means of making known the objects of the Association and the advantages of the use of gas as may seem expedient, and particularly by advertisements, circulars, and other printed matter.
   (C) To organize or promote and defray or contribute towards the expenses of exhibitions designed or calculated wholly or in part to promote the prosperity of the industry, and lectures or demonstrations having the like object, and for these purposes to convene or promote meetings or conferences.
   (D) To enable persons who are, or have been, engaged in the conduct of gas undertakings or in industries connected with the gas industry to meet and to correspond; and to facilitate the interchange of information and of ideas respecting methods for the commercial development of the industry.
   (E) To invite from the members and others communications relating to the commercial aspects of the industry.
   (F) To develop and improve the commercial methods of those engaged in the industry.
   (G) To print, and publish, sell, lend, and distribute any communications made to, and any reports of, the proceedings or transactions of the Association or any similar Society, and to purchase, reproduce, print, publish, and distribute any other printed matter relating to the industry.
   (H) To amalgamate, or enter into partnership, or any joint-purse arrangement, with any society having objects altogether or in part similar to those of the Association.
   (I) To purchase, take on lease, or otherwise acquire, in the names of the Trustees of the Association, and to maintain and dispose of any property for the purposes of the Association.
   (J) To borrow money for the purposes of the Association.
   (K) To do all other lawful things incidental to, or conducive to, the attainment of the objects of the Association.
3. The Association shall consist of a President, Vice-Presidents, Members, and Associate Members.
4. The government of the Association and the management of all its concerns shall be entrusted to a General and an Executive Committee subject to the Rules of the Association.
5. (A) The President shall be the President for the time being of the Institution of Gas Engineers.
   (B) The Vice-Presidents shall be elected from time to time by the General Committee from amongst eminent administrators connected with subscribing undertakings in the areas hereinafter specified, but not more than two Vice-Presidents shall be elected to represent any individual area.
   (C) The members shall be the representatives of the subscribing undertakings and societies nominated by such subscribers in accordance with the provisions hereinafter specified, and the members for the time being of the Council of the Institution of Gas Engineers (*ex officio*).
   (D) Associate members nominated and elected as hereinafter provided.
6. Each subscriber shall have the right to nominate representatives as members of the Association according to the following scale:

Subscribers contributing under £50 per ann.				2	members.
,,	,,	£51 to £100	,,	3	,,
,,	,,	£101 to £250	,,	4	,,
,,	,,	£251 to £500	,,	5	,,
,,	,,	£501 to £750	,,	6	,,
,,	,,	£751 to £1000	,,	7	,,
,,	,,	£1001 to £1250	,,	8	,,
,,	,,	£1251 to £1500	,,	9	,,
,,	,,	£1501 to £1750	,,	10	,,
,,	,,	£1751 to £2000	,,	11	,,
,,	,,	over £2000	,,	12	,,

7. Each subscribing gas undertaking may nominate for election by the General Committee as associate members any number of persons engaged in commercial work for such undertaking; and such election shall be in accordance with the provisions hereinafter contained.

GENERAL COMMITTEE.

8. (A) The General Committee shall consist of—
   (1) The Chairman, who is to be *ex officio* the President of the Association.
   (2) A Deputy-Chairman, who is to be the Chairman of the Executive Committee (*ex officio*).
   (3) Three Vice-Presidents, of whom one shall be nominated by the Council of the Institution of Gas Engineers, one by the Society of British Gas Industries, and one by the other Vice-Presidents of the Association.
   (4) An Honorary Treasurer, who shall be a Member of the Association, and be nominated by the Council of the Institution of Gas Engineers.

(5) Ordinary members representing—

(*a*) The several subscribing gas undertakings in the various specified areas mentioned below, and

(*b*) The Society of British Gas Industries or any similar Society.

Such respective representations shall be on the following basis:—

(B) The subscribing gas undertakings shall be grouped into the under-mentioned areas, each of which areas shall be represented by at least one member, with an additional member for every £500 per annum over £500 per annum, subscribed by the whole of the undertakings situated within that specified area:

1. Eastern District.
2. Ireland.
3. Manchester District.
4. Midland District.
5. Northern District.
6. Scotland.
7. Southern District.
8. South-Western District.
9. Wales.

(C) The Society of British Gas Industries or any similar Society shall be represented by at least one member, with an additional member for every £500 per annum over £500 per annum subscribed by such Society.

The names and addresses of such members shall be sent to the Secretary of the Association at least one month before the date of the Annual General Meeting.

ELECTION OF ORDINARY MEMBERS OF GENERAL COMMITTEE BY SUBSCRIBING UNDERTAKINGS.

9. (A) The members representing the subscribing undertakings in each specified area shall hold a meeting at least one month before the Annual General Meeting of the Association, at which they shall nominate candidates to represent on the General Committee that particular area, and the number of candidates so nominated for a particular area shall not exceed twice the number representing that area under the above-mentioned scale.

(B) The names and addresses of the persons so nominated shall be sent to the Secretary of the Association immediately after the meeting, and upon receipt thereof the Secretary shall prepare and send out balloting-lists to each subscribing undertaking in the specified area.

(C) Upon receipt of such lists each subscribing undertaking shall indicate, as therein directed, the names of the candidates for whom such subscribing undertaking wishes to vote, and shall return the balloting-lists to the Secretary of the Association so as to reach him not less than seven days before the annual general meeting; and the result of the election shall be announced at such meeting. The votes of any subscribing undertaking may be given to one, or divided amongst two or more candidates.

(D) Each subscribing undertaking shall be entitled to the same number of votes as is equal to the number of members of the Association which such subscribing undertaking is entitled to nominate under the provisions of Rule 6.

(E) For the purpose of constituting the first General Committee these rules shall be read as if the 1st day of December, 1911, were fixed for the first annual general meeting, and as if the members of the Committee were nominated and elected respectively as on that day; and they shall hold office until the date of the annual general meeting in the year 1914.

10. (A) At the annual general meeting held in the year 1914, and at each succeeding annual general meeting, the following members of the General Committee shall retire, and shall be eligible for re-nomination or re-election, as the case may be—namely, the three Vice-Presidents, one-third of the members elected, and one-third of the members nominated respectively, or the nearest possible number thereto.

(B) The members so retiring shall be those who have been longest in office, and in case of an equal term of office the members to retire shall be decided by lot.

(C) The General Committee shall have power to fill up any vacancy occurring amongst their members during the interval between the annual general meetings; and members so appointed shall hold office only until the next annual general meeting, when they shall be eligible for re-election. In exercising this power, the General Committee shall select a member from the specified area which supplied the member creating the vacancy. Should the vacancy be created in the case of a member nominated by any such Society as aforesaid, the vacancy shall be filled on the nomination of such Society.

(D) The General Committee shall meet at least once every three calendar months. Its main functions shall be to decide on the general policy of the Association, to receive and consider reports, and to transact any other necessary business. A quorum shall consist of not less than seven members.

(E) The General Committee may nominate, by resolution from time to time, two members of their Committee, or two members of the Executive Committee to sign on behalf of the Association any documents not relating to the acquisition of real or personal estate to be vested in the names of the Trustees of the Association.

THE EXECUTIVE COMMITTEE.

11. (A) The Executive Committee shall be responsible for the detailed work of the Association, and for all expenditure, and shall consist of eleven members, made up as follows:

(1) A Chairman, who will become *ex officio* the Deputy-Chairman of the General Committee.
(2) A Vice-Chairman.
(3) The Honorary Treasurer, *ex officio*.
(4) Eight members, to be elected by the General Committee from amongst the members of that Committee, but so that two of them shall be members of the Institution of Gas Engineers, and two shall be members of the Society of British Gas Industries.

(B) The Chairman and Vice-Chairman shall be appointed from time to time by the members of the Executive Committee from amongst themselves, and shall hold office for three years, at the expiration of which period and at the end of each succeeding year they shall retire, and shall be eligible for re-election. At the end of each of the like periods four members of the Executive Committee shall retire, and shall be eligible for re-election.

(C) Of the members so retiring one shall be a member of the Institution of Gas Engineers and one a member of the Society of British Gas Industries; and, except as provided by this rule, the members to retire shall be chosen in the same way as the retiring members of the General Committee.

(D) The Executive Committee shall meet whenever necessary, but not less often than once every calendar month. A quorum of this Committee shall consist of not less than three members.

SECRETARY AND OTHER OFFICERS.

12. (A) The Secretary shall be appointed and his remuneration fixed by the General Committee. He shall be subject to the direct control of the Executive Committee.

(B) The Executive Committee may appoint such clerks and other members of the office staff as they may consider necessary, and fix their remuneration. They shall be under the control of the Secretary subject to the general powers of the Executive Committee.

13. The Executive Committee shall be responsible for the general supervision of the work of the Association, and they shall have, amongst other necessary powers, those following, namely:—

(A) To engage an advertising agent, agents, or others to write and design advertisements and publicity literature of all kinds, to purchase or hire advertising space approved by the Executive Committee, and generally to advise and assist the Executive Committee on advertising matters, and to act as their press agent. Such agent or agents or others shall be paid on a basis of salary, or salary and commission, fixed by the Executive Committee.

(B) To determine the publications in which the general advertisements paid for by the Association shall be inserted, and the spaces to be taken in each.

(C) To consider all schemes for advertising placed before them by the agent.

(D) To consider and edit or appoint some person or persons to consider and edit all designs for posters, cards, newspaper copy, and other advertising matter submitted by the agent.

(E) To obtain and accept estimates and tenders for the execution of orders for blocks, booklets, posters, &c., and to arrange for the sale thereof to subscribers.

(F) To receive from the Secretary and present quarterly to the General Committee properly audited accounts of all receipts and expenditure.

(G) To employ suitable persons to write articles for the local and general Press, advocating the use of gas, or giving useful information respecting its developments, and to secure their insertion.

(H) To receive Press cuttings and reports of any statements, letters or articles in the Press injurious to the industry.

(I) To arrange for the preparation of suitable replies to such statements, letters, or articles, the replies being supplied to the local undertakings for their use where desired, or sent for publication, either on the authority of the Association or indirectly, as may be deemed advisable.

(J) To arrange for the answering of inquiries addressed to the Association by persons interested in the general advertisements issued.

(K) To arrange for the delivery of lectures and the holding of exhibitions.

TRUSTEES.

14. There shall be not less than two Trustees of the Association, who shall from time to time be appointed by the General Committee. Such Trustees shall be empowered to purchase and sell, hold, and dispose of, on behalf of the Association, real and personal property, and shall have full discretionary powers to invest any moneys in their hands in securities in which Trustees are empowered by law to invest Trust moneys, and in the securities and shares and stocks whether preference or ordinary of any railway, dock, gas, or water company incorporated by Royal Charter or Act of Parliament, or registered under the Joint-Stock Companies Acts.

HON. TREASURER.

15. The Hon. Treasurer shall be responsible for the funds of the Association except so far as they are held by, or invested in, the names of the Trustees.

ACCOUNTS.

16. (A) The accounts of the Association shall be from time to time examined by the Executive Committee and General Committee, and shall, so far as the Chairman may consider necessary, be read to the annual general meeting, together with the report on the general affairs of the Association during the preceding year.

(B) Cheques on the banking account of the Association shall be signed by two members of the Executive Committee, and countersigned by the Secretary.

AUDIT.

17. The General Committee shall in the first place appoint a firm of Chartered Accountants as Auditors of the Association. The remuneration of such Auditors shall be fixed by the General Committee. Such Auditors shall retire at every Annual General Meeting, and shall be eligible for re-election by the Association.

RETIREMENT OF MEMBERS.

18. (A) If any subscriber reduces the amount of its annual subscription, its power to nominate members shall be reduced in proportion according to the above-mentioned scale.

(B) In the event of such reduction, that subscriber shall intimate to the Secretary within 14 days thereafter which of its representatives shall cease to be members, and in default of such intimation the General Committee shall decide by lot which of such members shall continue, and which shall cease to be members.

VOTING POWER.

19. (A) The Chairman presiding at any meeting of the Association or of its Committees shall have a casting vote in addition to his ordinary vote.

(B) Every member attending a general meeting of the Association shall be entitled to one vote, but in the event of one or more of the members representing a subscriber being absent from a general meeting the member or members representing such subscriber shall be entitled to exercise at such meeting the full voting power of such subscriber.

(C) The Chairman of a meeting shall in the first instance, if he thinks fit, take the decision of a meeting by voting on a show of hands, but any member present at a meeting may demand a poll, which shall be taken at such time and place as the Chairman may direct.

ELECTION OF ASSOCIATE MEMBERS.

20. (A) The names and addresses of candidates nominated for election as associate members shall from time to time be sent to the Secretary of the Association, who shall submit a list of candidates to the next available meeting of the General Committee. The names of those so elected shall be regularly announced from time to time as and when may be necessary.

(B) Associate members shall pay to the Secretary of the Association a subscription of 10s. 6d. on the date of his election, and on every subsequent first day of January in every year. They shall be entitled to attend ordinary general meetings and the annual general meeting, but shall have no power of voting.

(C) Any associate member ceasing to be in the employment of a subscribing gas undertaking shall cease to be an associate member.

SUBSCRIPTIONS.

21. (A) All sums due from the subscribers shall be paid as and when due from time to time to the fund called the Publicity and Special Purposes Fund of the Institution of Gas Engineers. The Institution shall be entitled to retain not more than one-tenth of the amount so received for special purposes unless otherwise specified by the subscriber, and shall forthwith from time to time pay over the balance to the general account of the Association.

(B) If a subscriber has not paid a subscription within sixty days after it has become due, the members representing that subscriber shall, at the expiration of such period of sixty days, cease to be members of the Association.

GENERAL MEETINGS.

22. (A) The annual general meeting shall be held from year to year in different towns where the gas undertakings are subscribers. The date and place of meeting shall be determined at the previous annual general meeting.

(B) Notice of all general meetings shall be sent to every subscriber and member whose address is known at least one week before the day of meeting.

(C) The business of the annual general meeting shall be to receive the annual report and statement of accounts, to elect representatives on the General Committee and the Auditors of the Association, to discuss matters of interest and importance relating to the commercial side of the industry, and to conduct such other business as may in the opinion of the General Committee be necessary.

23. Ordinary general meetings shall be held at such times and in such places as may from time to time be fixed by the General Committee.

24. With the permission of the President, visitors may be introduced by members at any meeting.

25. No paper shall be read at any meeting of the Association unless it shall previously have been approved by the Executive Committee.

26. The General Committee may at any time call a special general meeting of the Association. Twenty members at least shall be necessary to constitute a quorum at any general meeting.

27. The Chairman of any meeting shall have power to rule and regulate the discussions arising at any meeting of the Association.

ALTERATION OF RULES.

28. (A) Any alteration in or addition to these rules, recommended by the General Committee, may be proposed at the annual general meeting.

(B) No proposed alteration or addition shall be considered by the Committee unless it has been sent to the Secretary at least four months before the annual general meeting.

(C) No alteration or addition to any of these rules shall be considered valid unless concurred in by the votes of three-fourths of the members present and voting.

MINUTES.

29. Minutes of the proceedings of every meeting of the Association and of every Committee meeting shall be taken during their progress by the Secretary or some other person authorized by the Chairman, and they shall be read at the next meeting of the Association or of such Committee as the case may be, and when confirmed shall be signed by the Chairman. But the Chairman shall have power to dispense with the reading of minutes at a general meeting.

PROCEEDINGS AND TRANSACTIONS.

30. (A) The General Committee may from time to time publish the Proceedings and Transactions of the Association, accompanied with such other matter as occasion may require.

(B) Each subscriber shall be entitled to a copy of the publications of the Proceedings and Transactions of the Association free of charge; but the mode of distribution shall be decided by the General Committee.

OBITUARY.

SIR SAMUEL SADLER.

We regret to record the death on Friday last, after an illness extending over several weeks, of Sir Samuel Sadler, head of the well-known firm of chemical manufacturers at Middlesbrough. Deceased was the third son of the late Mr. James Sadler, of Langley Hall, near Birmingham, and was born in 1842. He was educated privately and at University College; among his teachers being Michael Faraday. After graduating at the London University, he obtained practical training in the works of Messrs. Chance, of Oldbury, then the largest firm of chemical manufacturers in the world. At the age of 27, he began to build up at Middlesbrough the extensive chemical business which has ever since been associated with his name. In 1883, the business (which then had branches at Ulverston, Portsmouth, Stockton, Carlton, and elsewhere) was converted into a limited Company; its founder becoming first Managing-Director and afterwards Chairman. His business activities were by no means confined to the chemical industry, as he was a colliery owner and was largely interested in several colliery companies. He was also closely connected with the gas industry, and was an associate member of the North of England Gas Managers' Association, of which he was elected and served as President in 1894.

Sir Samuel from the first actively identified himself with the public life of the town and port of Middlesbrough; and he was elected a member of the Town Council so far back as 1873. Four years later he was made Mayor, but resigned before the end of his term of office in order to contest the borough in the Conservative interest. On this occasion, as also at the elections of 1880 and 1895, he was unsuccessful; but in 1900 he defeated Mr. J. Havelock Wilson by 55 votes. In the election of 1906, however, Mr. Wilson obtained a majority of 2407. Before the Unionists went out of office in 1905, Sir Samuel was knighted. He was called upon to fill the mayoral chair at Middlesbrough for the second time in the year of Queen Victoria's Diamond Jubilee, and for the third time in the present year. He was the first Chairman of the Tees Port Sanitary Authority and a member for a great many years of the Tees Conservancy Commission, the Stockton and Middlesbrough Water Board, and the Tees Fishery Board. He was prominently identified with the Volunteer movement, retiring with the V.D. in 1896, after having been Colonel of the 1st V.B. Durham Light Infantry for twenty-one years. He was on the Commission of the Peace for Middlesbrough, the County of Durham, and the North Riding of Yorkshire.

Sir Samuel was twice married; and the present Lady Sadler is a daughter of the late Mr. John Field, an ironmaster of Oldbury. He leaves several sons, one of whom is a colliery owner, and another (Mr. Stanley Sadler) a member of the Middlesbrough Corporation. The latter takes keen interest in municipal affairs; and when, early last month, Sir Samuel resigned the Mayoralty on account of ill-health, and Sir Hugh Bell, Bart., was elected to the civic chair for the remainder of the term, Mr. Stanley Sadler was appointed Deputy-Mayor. Two younger sons are in the Army, and have seen much active service. The funeral was arranged to take place yesterday.

CONCILIATION IN LABOUR DISPUTES.

In the last issue of the "Journal" some of the main points were given from the first part of the report in connection with industrial disputes in 1910, which was recently issued by Sir G. R. Askwith, of the Labour Department of the Board of Trade. This dealt solely with strikes and lock-outs; the second portion, which may be shortly noticed now, furnishing particulars of the work during the year of Conciliation and Arbitration Boards.

In the course of a brief introduction to the report, Sir G. R. Askwith says it is satisfactory to note that, as in other recent years, methods of conciliation and arbitration were extensively used in 1910 in the settlement and prevention of labour disputes. The number of workpeople directly involved in disputes settled by such means in 1910 was the highest recorded in the decennial period for which statistics are presented in the report; while the number of cases annually settled by permanent boards of conciliation, which in the previous year had risen to a high figure, showed a further increase in 1910. Of the 531 disputes which began during last year, 58 (directly involving 171,773 workpeople, or 44·6 per cent. of the total directly involved in all the disputes of the year) were brought to an end by conciliation—that is to say, by the mediation of a third party or board—or else by reference to arbitration. These figures, however, do not present an exact record for the year of the disputes settled by the means named, as they include some cases in which a settlement was not arrived at until 1911. On the other hand, they do not include disputes which began before 1910, but were settled during that year by conciliation or arbitration.

Dealing first with actual stoppages of work—the settlement of which is, of course, only one part of the scheme of conciliation and arbitration—it may be pointed out that in 1910 there were 59 strikes and lock-outs settled by the methods now under consideration; whereas in 1901, the number was 37, and in 1909 63. But although the number of disputes settled by conciliation or arbitration last year did not quite reach the high figure of 1909, the number of workpeople directly involved in these settlements was, as already stated, the highest during the past ten years—largely owing to the extensive disputes in the cotton and shipbuilding industries, which were settled by the mediation of the Board of Trade. During the ten years under review, we learn, conciliatory methods of settling disputes have been adopted more frequently in the mining and quarrying industries than in any other group of trades. Of the 414 disputes (directly involving 484,960 workpeople) settled by conciliation or arbitration during the period 1901-10, no less than 124 (directly involving 143,516 workpeople) occurred in these industries. The metal, engineering, and shipbuilding trades come next, with 63 disputes; then the building trades, with 60 disputes; and after that, the textile trades, with 57 disputes. Of the 59 disputes settled in 1910 by conciliation or arbitration, 34 were arranged by conciliation, and 25 by arbitration. There were 15 of them settled under the Conciliation Act of 1896; and this compares with 23 disputes so settled in 1909, and 16 in 1908. In six of the cases last year, the disputes were settled by conciliation under the Act referred to; and in nine, by arbitrators appointed in accordance with the provisions of the Act.

The figures so far given, as has been pointed out, refer solely to those disputes in which an actual stoppage of work occurred, whether or not permanent boards of conciliation were involved. The main part of the work of such bodies is, however, not the settling of strikes and lock-outs, but their prevention by timely and effective action. The number of permanent boards of conciliation and arbitration known to have taken action in 1910 was 109; and the number of cases considered by them was 1971, as compared with 1997 cases considered by 124 boards in 1909. There was thus some decrease in the number of boards taking action last year, as compared with that of the preceding twelve months. Of the 1971 cases considered in 1910, 788 were settled by the boards or their committees, and 299 by umpires or arbitrators appointed by them. Of these 1087 cases, only 14 involved any stoppage of work—six of these being in the coal-mining industry, three in the building trades, and the remaining five in other branches of industry. In 724 cases, the questions in dispute were withdrawn or else settled independently; in 15 instances they were referred to higher boards; and the remaining 145 cases were still under consideration at the end of the year. As usual, the matters that were dealt with varied greatly in importance. On the one hand, one case relating to an advance in wages arranged by the Board of Conciliation for the coal trade of Monmouthshire and South Wales affected 190,000 workpeople; on the other, the 407 cases settled by the Durham Miners' Joint Committee concerned generally only a few employees. The greatest number of cases settled was, of course, in the mining and quarrying industries, which accounted for more than one-half of the total number of cases settled during the year by all the boards. This preponderance, it is pointed out, is due to the Joint Committees for the coal trade of Northumberland and Durham, which deal solely with disputes at individual collieries, and in 1910 settled 561 out of the 657 disposed of by all the boards and committees in this group. The number of boards which have settled cases in the last five years, so far as is known to the Labour Department of the Board of Trade, is as follows: 1906, 78; 1907, 73; 1908, 83; 1909, 101; and 1910, 96. During the past year, some new boards and committees were formed; but, at the same time, there were several which ceased to exist. It may be remarked that there are also in existence certain arrangements between employers and workpeople for the settlement of disputes by conciliatory means which do not quite fall within the description of what is usually understood by conciliation boards—such as the schemes in operation in the cotton, engineering, and shipbuilding trades.

TWO VIEWS OF GAS INSTRUCTION.

[Communicated.]

The five different Commissions recently appointed by the Société Technique de l'Industrie du Gaz have not lost much time in preparing their first reports, which, thanks to the President, M. Marquisan, the "Journal" has been enabled to publish. At the time of the setting up of these permanent and directive Commissions, they were welcomed as likely to prove of great benefit, not only to members of the French Gas Society, but also to gas engineers generally. These hopes, I feel sure, will be realized more and more as time passes. Even these first reports, which, from the nature of things, are bound to be more or less tentative and preliminary, are instructive and important from many points of view. More particularly is this the case with that dealing with Technical Instruction. [See next page.]

It is, of course, a commonplace to say that of schemes of instruction and of conferences on education, there is no end. Quite recently, the Institution of Civil Engineers, as will be remembered, gathered together all sorts of educational experts so as to discuss a series of illuminating short papers on the training of engineers. It is doubtful if more will result than a mass of print and paper embodying divergent views, each mutually destructive of the other, and leading nowhere. Such a result is so often the outcome of discussions on what is so vaguely called "education" and so mysteriously labelled "technical." This danger the French Gas Commission are obviously and properly aware of; for their excellent report concludes with an appeal for the assistance of all to enable tangible and practical results to be speedily arrived at.

But for the present purpose, the report is especially useful, in that it focusses attention on two different methods of educational procedure, both of them having the same object—viz., the best possible recruiting of engineers for the gas industry. Omit for the moment that part of the problem which is devoted to improving the training and mental equipment of gas foremen and fitters; for as to this, there is but little divergence between the theory and practice followed by various schools in different countries. But in regard to the higher grades of gas engineering, there are two main schools of thought, which may concisely be called, respectively, the German and the French. Exactly what place in or between these two the English system would occupy, may not be altogether free from doubt; but I think the best British educational authorities would certainly incline to the French method. Briefly, it may be said, the German view of technical instruction begins, progresses, and ends in specialization; or, in other words, in directing, at an early stage, the studies of the student wholly with an eye to what the student is going to do as his life's work. Everything is subordinated to this one object; so much so that even the training of a works' foreman is confined to make him a good foreman, but not on any account to enable him to rise to be a good gas manager and engineer. The French view, on the other hand, may be said to be, first and foremost, a thoroughly sound general education, with later on such specialization and limitation of studies as may be found necessary to befit the student for whatever particular branch of industry he takes up.

For my own part, my sympathies are with the latter school of educational thought. The primary object of all education is not to make a soldier, a lawyer, a doctor, or an engineer, as the case may be, but to make a man—that is, to lead out, cultivate, and develop the best capabilities and natural talents that lie dormant in the budding individual. True, the individual will probably, sooner or later, have to devote his particular and special abilities into one more or less restricted channel of labour; but the French view is that the wider his real education is at first, the better will be his specialization later on. The best gas engineer is he who has been educated widely, thoroughly, and soundly, without regard, up to a certain point, to gas engineering at all; not he who first and last is a gas engineer, and nothing but a gas engineer. Paradoxically, it might almost be put, that to train a man to be a gas engineer, he should be taught not to be a gas engineer. In short, broad is the path of true education; narrow is the way of specialization. As one well-known and learned Professor once expressed it: Specialization may be good for the guineas, but it is bad for the brain. And the goal of education is not the arming of the individual so that he can fight for and accumulate the most guineas, but that he may in himself be strong in body, and sound and resourceful in mind.

The French report pays a eulogistic tribute to the practical and energetic English—rather, British—engineer, whose training should be directed to the best bringing out of his native qualities and characteristics. The compliment may be warmly returned to our French colleagues, whose wide and intelligent training has everywhere made of them admirable co-workers, and, in the words of the report, which are fully endorsed, has established "the glory and the strength of the body of French engineers."

THE DAMAGED GASHOLDER AT THE BRIGITTENAU (VIENNA) GAS-WORKS.

Herr F. Menzel, the Manager of the Vienna Corporation gas undertaking, has written to the last number to hand of the "Journal für Gasbeleuchtung" with reference to the statement attributed to him in the "Neue Freie Presse," to the effect that accidents such as that which happened on the 4th of August to the gasholder of 8,830,000 cubic feet capacity at Brigittenau were not altogether unavoidable. The statement was copied by our German technical contemporary and was given in our translation of the "Neue Freie Presse" report in our issue of Aug. 22, p. 478. A technical authority quoted by the "Journal für Gasbeleuchtung" stated that he could not fall in with the view put forward in the interview, that such accidents were unavoidable. Herr Menzel writes to explain that the reporter put words into his mouth which he did not actually use. He said that, in constructional work of such an exceptional kind, accidents were never entirely avoidable. He expressed himself thus with the object of supressing needless uneasiness, and of avoiding a sensational character being given to the incident in the Press. The Vienna newspapers consequently reported the event as an "accident" to the new gasholder. Herr Menzel complains that the "Journal für Gasbeleuchtung" in its report used the sensational heading of "Collapse of the 250,000 Cubic Metre Gasholder at Vienna." Incidentally, he remarks that it is imperative in the interests of the gas industry that such occurrences should be avoided, and that the cause of the deformation which took place of the bell of the gasholder should be clearly ascertained. A distinguished technical man has been engaged to investigate the matter; but for the present Herr Menzel is unable to speak more fully as to the cause.

FRENCH COMMISSIONS' REPORTS.

(*Concluded from Vol.* CXV., *p.* 802.)

COMMISSION ON TECHNICAL INSTRUCTION.

Captains of industry have for a long time past been concerned with the difficulties they meet with in recruiting their staffs. These difficulties become more accentuated day by day, owing to the ever more strenuous development of industrial activity and the greater competition of rivals in the commercial world. This position has been particularly felt in the gas industry during recent years, on account of improvements in methods of production in consequence of considerable reductions in the price of gas. These improvements have led gas undertakings to find for their works' staffs a larger general knowledge, without ignoring, however, details and handicraft. Commercially, the persistence with which competitors of gas apply themselves to extending their field of action, leads gas companies to endeavour to obtain able assistants, loyal and competent, to ensure effective service of their clients' needs in the outside and commercial departments. Again, as regards the working employees, it is unfortunately useless to insist on the deplorable consequences of there being less and less apprenticeship.

Such a situation is not peculiar to France. This fact may to a certain extent prove consoling; but it must not lead to inactivity, for colleagues abroad are more awake. They have taken important steps some time back to remedy this state of things; while in France it has been deplored, but not remedied. To be just, however, some have made individual efforts; but no collective action has been taken. The Paris Chamber of Commerce has for some time past considered the very important question of industrial and commercial technical instruction. The Conseil Supérieur de l'Enseignement Technique and the Conseil Supérieur du Travail are engaged on the subject, as well as nearly all the industrial and commercial groups. The Commission of the Société Technique considered that the Society ought to take its share in the general effort being made, without prejudice to its own particular concern in regard to the gas industry.

Those interested in the question of technical instruction are referred to the remarkable report (published in 1910) which M. De Ribes-Christofle has submitted to his colleagues of the Paris Chamber of Commerce.

As soon as formed, the Commission on Technical Instruction gathered all the information possible on what was done abroad. From this preliminary work will be seen the state of affairs in different countries, and the result of the investigations.

England.

The report expresses thanks to Mr. R. S. Gardiner, who is a member of the Commission, for the interesting and detailed information which he was enabled to give concerning the system of instruction and apprenticeship adopted by the Gaslight and Coke Company. In an appendix to the report is given the translation of a letter (dated April 29, 1911) from Mr. D. Milne Watson, in which he shortly described the methods of instruction, and enclosed forms and particulars of the scheme of the Gaslight and Coke Company's training. The Commission's report reproduces these at length, including the notice dated December, 1908, as to the training of gas-fitters, the programme (April 26, 1906) for the instruction and examination of outdoor inspectors, the form of apprenticeship agreement, and the syllabus of lessons in gas lighting. All these have been given in the "Journal," and so need not now be further referred to.

The City and Guilds of London Institute, founded in 1878, and under official control, is an association formed and maintained by the City and different industrial and commercial Corporations of the City of London. Its instruction covers everything concerning science and arts. Its technical teaching is given in two colleges, called technical, which receive students respectively of 15 and 16 years of age. The period of instruction varies from two to three years. As regards gas, it is divided very clearly into two classes—"Gas Engineering" and "Gas Supply." In each of these divisions are two grades of examination covering the same questions, but of much more advanced and scientific a character for the higher grade. The examiners are always chosen from among prominent gas engineers. It is to be observed that the studies extend to the latest improvements in gas technics; and it may be said that anyone who has followed the course with profit is in a good position to become a real gas engineer. The City and Guilds also includes a section relating to plumbers' work and sanitation. The examinations cover questions both in theory and practice, and in written compositions and actual work.

A centre of instruction which recently, from a gas point of view, has developed considerably, is the University of Leeds, one department of which covers metallurgy, mines, fuel, and gas. The period of study is three years. In the first two, the study is common to all the students; the third year is devoted specially to gas. Facilities are given during the summer months to acquire certain practical experience in works. The Institution of Gas Engineers has established a Chair of Gas Research in memory of the great gas engineer, Sir George Livesey. The laboratory of gas instruction at Leeds has been equipped by an important firm of gas-apparatus makers of Leeds, and also by the Leeds Gas Committee. The distinguishing features of the instruction given are at once its scientific and technical character, the encouragement given to personal research, and the broad standpoint of its administration. The names of Professor A. Smithells and Professor W. A. Bone are mentioned in this connection.

The movement started at Leeds has extended to other towns, notably at Manchester, where two Associations of Gas Engineers have arranged with the University there to organize studies of the same kind. The question arises whether the Livesey foundation, which to-day has reached a considerable figure, could not profitably be extended in part to other Universities carrying on analogous work.

It is seen, therefore, that in England there is a strongly marked movement for the deve'opment of professional gas training. Dr. Bunte, in his report submitted to the last meeting of the German Gas Association, suggests that the example given by Germany is not altogether unconnected with the movement in England, and especially at Leeds. On the other hand, at a recent meeting of the Society of British Gas Industries, the President (Professor Smithells), while fully recognizing the value of the example given by Germany, rightly set out that transplantations were not always successful, especially in political or educational matters, and pointed out the advantage to his countrymen of their native qualities of energy, prompt decision, and quick grasp, which make of the English, *par excellence*, the practical man.

Germany.

In Germany, two Commissions have been established by the Gas and Water Association to further the objects in view. In the volume published in 1909 by the Association, on the occasion of its fiftieth anniversary, is to be found a review of the labours of these Commissions.

The Commission on Training (Unterrichts Kommission) was founded in 1897 to examine the methods of training gas engineers in the higher technical schools, and also to build up gas technicians of a lower order, especially foremen and head fitters. The plan of study devised by the engineers consisted in lectures and work at the higher technical school at Carlsruhe, where Professor Bunte had some years before established gas chemists. Moreover, for engineering mechanics who had finished their course and who desired to acquire chemical knowledge relating to lighting, an abridged course of study for two half-years was instituted. Further, for those already having situations in the gas industry, and desirous of familiarizing themselves with chemistry, a course was started at Carlsruhe Chemical and Technical Institute.

With regard to the education of foremen and fitters, the Cie. Continentale of Dessau, in 1897, opened a school, the pupils at which had also to attend the manual apprenticeship schools existing in the town. To be admitted, it was necessary to have already had three years as a practical worker. Following upon the preceding facts, the Commission on training marked out a practical and theoretical programme, embracing also a financial side, in view of the creation, either by the German Gas Association or by affiliated Societies, of other similar schools. Thus, there are now six schools in Germany (Bremen, Köenigsberg, Breslau, Berlin, Munich, and Cologne), receiving grants from different sources, not having all the same plan or the same length of study, but the curriculum of which appears to be restricted, as to its theoretical part, to what is strictly necessary, so as not to exceed the end in view, which is not to turn out managers even of small works, but rather to raise up foremen and fitters who have already worked in gas-works.

The Commission of the Institute of Instruction and Research (Kommission für die Lehr und Versuchsgasanstalt) had for its

origin the question of the analysis of coal, which the German Gas Association considered in 1869. It was only later that the position of the Association enabled it to examine a scheme for the construction of an experimental works, and to draw up a plan of organization, consisting in establishing such works at Carlsruhe on land gratuitously granted by the town for 25 years. The works had to be an annexe to the Institute of Physical Chemistry, and at the same time to be devoted to the training of gas engineers. A special organizing Committee was formed, consisting of various gas managers, the Manager of Carlsruhe Gas Works, and Dr. Bunte, Principal of the Institute. For financial support, both for the construction and administration of the works, an appeal was made to societies and gas undertakings. It was encouraged by the Government of the Grand Duchy and the town magistrates. Constructional firms equally assisted with plant and with apparatus of all kinds, and with the required scientific and experimental material. The construction was begun in August, 1905, and was completely finished in the spring of 1907.

To combine science and practice, with a view to researches to be made on all questions touching the manufacture of gas and its applications, and to afford gas engineers instruction in this double character, were the objects aimed at. These were greatly aided by the connection of the Institute of Training and Research with the Institutes of the Ecole Supérieure.

The principal investigations were on gas coals from various sources; chemical composition, calorific power, laboratory or works' tests, and statistics. The experiments were extended to questions relating to coke, tar, ammoniacal liquor, oils for washing, purifying material, photometric tests, and others on burners and lamps, automatic lighting, heating apparatus for gas and coke, &c. The Institute proceeded at Munich, Zürich, &c., with experiments on vertical and chamber retorts.

As regards the training itself, it took three forms:

1. Complete chemical instruction for gas engineers.
2. Instruction given to mechanics on physical and chemical knowledge relating to the manufacture and distribution of gas.
3. Instruction by means of holiday courses for adult practical gas engineers.

The Carlsruhe curriculum comprises courses, lectures, and practical work. To obtain the degree of engineer, the students must follow the regular course, and not only pass an oral examination on the principal branches of their studies, but also submit a thesis on a subject chosen by the Principal of the Laboratory. The students thus learn to reason for themselves; and their aptitude for dealing with scientific problems is tested. This system of requiring research or personal work on set questions is pushed still further in a more advanced course, reserved for students who wish to obtain the degree of Doctor of Engineering, which frequently arises in the chemical division. This gives abundant facilities to the professor and the students of working on important technical questions; and as later they will be confronted by more or less the same problems, which they will have to solve by themselves, this instruction is of special importance in the exercise of the profession adopted.

These latter considerations are taken from a communication made by Dr. Bunte to Mr. Thomas Glover, which he reproduced in his presidential address to the Institution of Gas Engineers in 1909 [see "JOURNAL," Vol. CVI., p. 609]. Mr. Glover rightly insisted on other conditions and special qualities, which, independent of instruction, were necessary for the conduct of business.

In 1909, the Institute replied to 1122 inquiries, by answers to questions or by reports relating to researches.

The expenditure on the first cost of works was about 110,000 marks, of which 14,000 marks were for furniture. The annual receipts are 47,144·73 marks (grants, analysis fees, &c.). The expenses do not reach 37,000 marks.

The Commission on Training draws attention in its report to the 1910 Congress of the German Gas and Water Association, to the working of the different schools of foremen and fitters. At Cologne, it may be remarked, there are courses for (*a*) gas and water fitters, (*b*) electrical fitters, (*c*) electrical erectors and superintendents, and (*d*) gas foremen. Up to the 1st of April, 215 foremen have been trained; the length of training varying from four to eight weeks, and being 48 hours per week.

At Bremen, there is a course of construction in retort-beds for gas foremen. Everywhere is noted the increase in the number of assistants and the good effect of the training.

Switzerland.

Zürich is the town where questions of research on the technology of gas have been most studied in Switzerland. The value of the work of Professor Constam is too well known for it to be further referred to. At the Zürich Gas-Works, under the control of the distinguished Engineer, Herr Weiss, there is an experimental works on the lines of those at Carlsruhe. It will render greater and greater services to Swiss gas engineers.

Austria.

An Institute of research and training has recently been established at Vienna, similar in idea to that which led to the creation of the Institute at Carlsruhe.

Italy.

M. Dejongh, the General Manager of the Anglo-Romano Gas Company at Rome, has made an agreement with the City to establish a school for gas and electrical workers. The Company provides a subsidy of 1600 lire per year, as well as supplying the scientific apparatus, electrical current, gas, and teaching material. In addition, by its engineers, it attends to the training in special courses, and provides tutors and assistants. The City of Rome gives, on its side, an annual grant of 1600 lire; and provides the premises, maintains and heats them, and appoints the superintending staff. The management is entrusted to the Director of the School of Mechanical and Electrical Arts of Rome. The students who qualify in the examinations at the end of the preparatory year are admitted at the beginning of the following year to the higher theoretical and practical course. At the end of the second year, the students who have qualified by examination receive a professional certificate. The lessons are given in the evening of all working days.

Summary.

To sum up: The review of the technical position in the different countries shows that the question is more advanced abroad than in France. The Commission therefore thinks that the moment has come to overtake this backwardness as soon as possible, and it has begun the immediate examination of the question. From the investigation, it results that the point of view of higher training does not present itself to them in the same way as it does abroad, because the great French engineering *écoles* give to their students technical training of a general character, which enables them, on leaving the schools, to specialize very quickly in the branch of industry which they select.

From the point of view of the foremen, the general instruction given in France in primary training, together with the numerous free courses which are established in nearly every town, puts them in a position more favourable than that abroad. To improve, therefore, the present state of affairs, both from the point of view of the higher staff and of the foremen and the head workmen, the Commission finds itself confronted with a special situation which leads it to undertake the investigation of the bedrock of the question, and to ascertain the methods of effecting this improvement by procedure which will certainly be different from that adopted by their foreign colleagues.

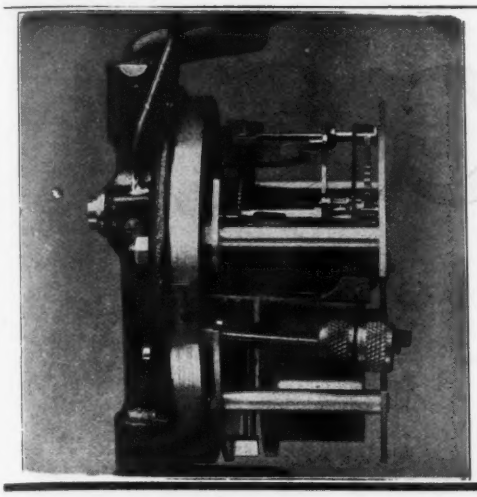
In the matter of training, France, with every reason, has for a long time adopted the method which consists in giving to all classes of the social scale the most thorough general training possible, and in entering only on the path of specialization after the individual has had his intelligence opened by general training, and is familiar with methods of work and of study, which are common to all branches of industrial activity. The report continues: We are persuaded that you will regret with us the attempts that have been made to lower in France the level of this general training which constitutes the glory and the strength of the body of French engineers, and that you will associate yourselves without reservation with the efforts that are being made to combat the attempts at specialization in our country. The letter that was addressed by M. Guillain to the public authorities has sounded the alarm and has produced a beneficial effect, in which we rejoice.

Abroad, specialization is undertaken, so to speak, as the beginning of training. The difference between these two methods of procedure has given rise, in international congresses dealing with these questions, to extremely interesting discussions, in which the arguments in favour of the two methods have been set out. From the point of view of simple results, we consider the French method has real advantages, inasmuch as French engineers and chiefs and foremen who carry on work abroad have been in the past, and still are, greatly valued. They have shown, and every day still show, that, thanks to this sound general training which has been given to them, they are able to emerge creditably from the most difficult situations by quickly adjusting themselves to local usages, by turning to account local resources, by distinguishing themselves everywhere as men of action, and by creditably supporting the comparison with their foreign colleagues, who themselves enjoy the advantage of moving in a familiar environment.

The examination of the considerations, which have just been summarized, has been the first work of the Commission. It has been followed by the examination of the position in France; and the result of it has been the drawing-up of a programme of work which may be epitomized as follows:

1. Instruction to be given to engineers leaving the great French schools, in order to enable them quickly to render effective service upon entering the gas industry.
2. Organization of the training to supply the gas industry with heads of outside departments for average and small works.
3. Organization of technical training to be established for the making of foremen for gas-works.
4. Organization of technical training to be established for providing good plumbers for average and small works.

The Commission proposes to examine, in order, the different articles of this programme of work; and so as to arrive as soon as possible at tangible results, it appeals for the assistance and goodwill of all members of the Société Technique, asking them to interest themselves in this important question of the professional training of all ranks, by helping the Committee of the Society and the Commission with new and interesting ideas that the study of the question will suggest to them, and also by forwarding information which they may be able to procure. In a word, they appeal to them to contribute to the quickest possible advancement of the study of this question, so as rapidly to obtain practical results in the general interest.



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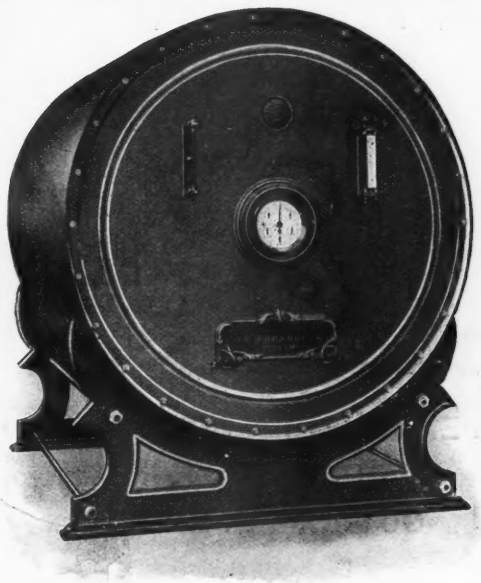

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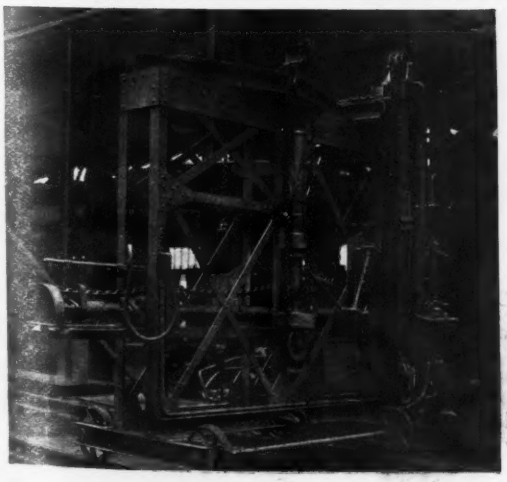

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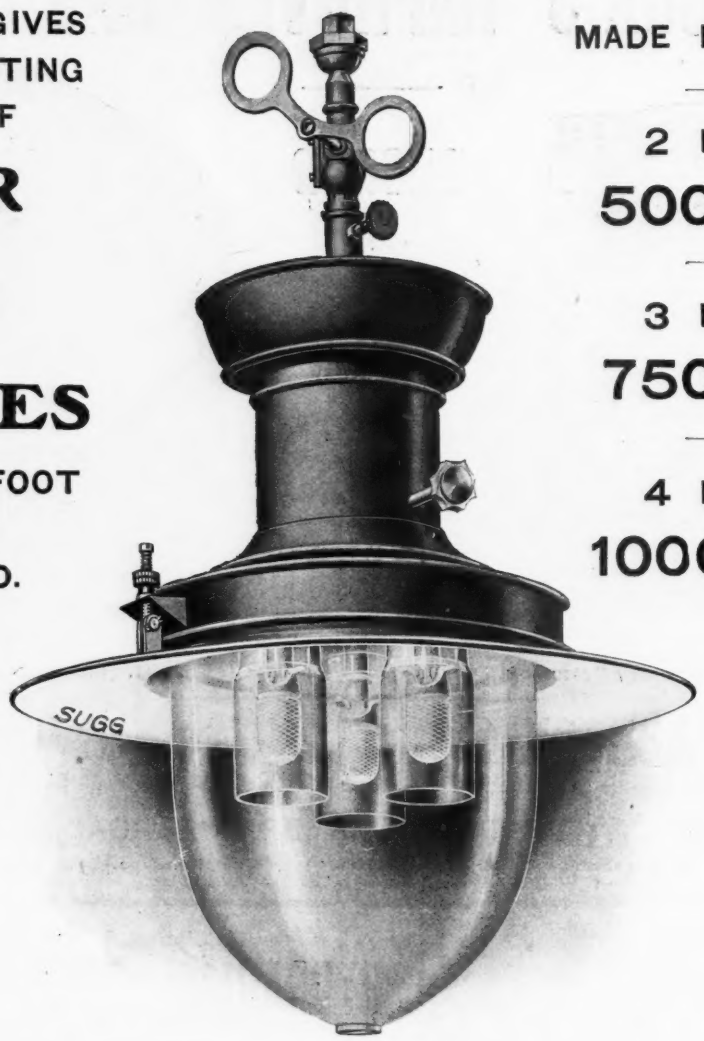

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THE LUXOMETER.

THE following particulars of a compact, handy, and withal practical little photometer, should prove of exceptional interest, in view of the widespread concern being shown in the measurement of illumination, both interior and exterior. This has led to a demand for an inexpensive instrument, which, while not claiming to be a standard in the same respects as the Trotter portable photometer, could yet be relied upon to give results of ample accuracy for all purposes, and which was, at the same time, not only light and portable, but, above all, easy to use.

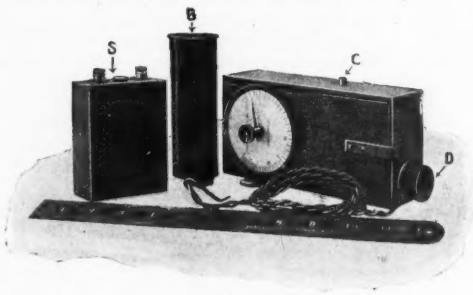


Fig. 1.

In the past, portable photometers have been looked upon somewhat as luxuries, to be possessed only by the larger undertakings; and it is with the object of dispelling this erroneous idea that the "Luxometer" has been placed on the market by Messrs. Everett, Edgcumbe, and Co., Limited, to whom we are indebted for the following particulars.

The instrument is very compact, as shown in fig. 1—the complete outfit, including the "Luxometer" C; the battery S; and the daylight attachment B. It may be added that the weight is only 1½ lbs. There is a long open scale, about 6 inches long, which (in standard instruments) is graduated up to 10 or 20 foot-candles, as preferred, with two ranges. It is specially opened out at the lower part so that great accuracy is possible even when measuring feeble illuminations. The scale is absolutely direct reading. When in use the instrument is held in the hand—no stand or other support being required—see fig. 2. For transport, both the photometer and the battery can be carried in the pocket, or they can be supplied fitted in a small leather case with a shoulder strap.

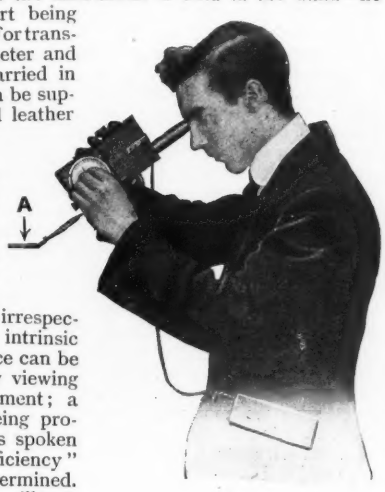


Fig. 2.

Illumination measurements can be made at any angle, irrespective of the colour of the light; and candle-power measurements can also be readily made irrespective of colour. The intrinsic brilliance of any surface can be instantly measured by viewing it through the instrument; a simple attachment being provided whereby what is spoken of as the "window efficiency" of a room can be determined. Merely to state that the illumination observed in a certain room lit by daylight was so many foot-candles is meaningless—depending, as it does, entirely upon the state of the sky. By means, however, of the attachment (B in fig. 1), on the other hand, a definite figure can be obtained for this illumination independently of the brightness of the day.

Mr. P. J. Waldram, to whom the development of this method is mainly due, has made a number of measurements in this way; and the following figures have been obtained:—

Patent Office Library, centre	0·005
British Museum Reading Room	0·007
Ordinary Offices (centre of room)	0·001
Speaker's Chair, House of Commons	0·0009
Woolsack, House of Lords	0·0006
Charing Cross Station, booking hall	0·0001 to 0·0003
Surveyor's Institution (centre of library)	0·0015

In order to simplify the adjustment, a yellow tinted externa screen is provided, and should be used in place of the white screen. By this means the colour of the daylight illumination is reduced to something near that of the standard lamp inside the instrument, so that an accurate balance is easily obtained. No allowance need be made for the colour of the screen, owing to the fact that the same colour is used both inside the room and in obtaining an outside reading. Its effect thus cancels out.

The principle upon which this photometer is based is a modification of the well-known Trotter method, in which the illumination derived from an electric lamp, contained in the case, is adjusted until it is equal to that to be measured. A pointer moving over a direct reading scale indicates this illumination without any calculation whatever. Of all the standard lamps which have been tried with portable photometers, the electric lamp has (say Messrs. Everett, Edgcumbe, and Co.) proved itself to be by far the most satisfactory, and some recent investigations by Mr. A. P. Trotter show conclusively that such a lamp worked off a portable accumulator more than fulfils all requirements.

The cell supplied with the "Luxometer" is of a special "non-spillable" type contained in a celluloid or ebonite case, so that it can be used in any position (or carried in the pocket) without fear of spilling. It only requires charging at rare intervals.

HILL INCANDESCENT MANTLES.

MANY readers of the "JOURNAL" will probably remember the name of Henry Hill and Company, Limited, of Berlin, who are widely known as manufacturers of high-grade incandescent lamp mantles. Hitherto their attention has been mainly given to the production of this class of mantles; but we learn that they have now decided to make on a larger scale those suitable for domestic purposes, at a price which, in view of their quality, will compare favourably with that of other mantles on the market. Hill mantles are made for all systems of lighting—gas, petrol, petroleum, or acetylene—and in various sizes; and it is claimed for them that they will stand high pressure and vibrations, and be available for use where ordinary mantles fail. The only points they have in common with the latter are their shape and size. Some particulars as to their manufacture may thus be of interest.

The fabric of the mantle consists of the finest ramie, and the "beehive" knitting (known in the export trade as "Torchon" J.F. or J.Z., and in the home trade as the "Four Star" 753 and 754 respectively) and the special treatment to which it is subjected produce mantles of unusual strength, which the makers state are absolutely unshrinkable, and in every respect suitable for high-pressure work. They can consequently be recommended to railway companies, to gas companies for street lighting, to shopkeepers, and for use in all places where there is vibration to contend with. Mantles made with the fabric known as "Four Star 753" are put forward as being peculiarly adapted for the lighting of wharves and exposed places; their qualities being different from those of the ordinary household mantles manufactured by the firm. The special mantles are to be had in both upright and inverted types, and in all sizes. Being made entirely by hand, they are of good shape. As is well known, it is absolutely essential that the mantle should fit the burner if the maximum light is to be obtained. This is a point to which special attention is paid by the Hill Company; every mantle being fitted over a gauge before being boxed, and thoroughly examined by experts before leaving the factory.

We are informed that the home trade of the Company is growing rapidly; and as a number of applications have been received by them for a good mantle at a reasonable figure, they are making them in various qualities at different prices. They do not make the very cheapest brands, which they submit are of no use to buyers who wish to keep their customers; but they endeavour to produce mantles of qualities to suit requirements and at the same time give satisfaction. In a future issue, we hope to give some particulars in regard to their manufacture; and the writer of the article, who will be an expert in mantle making, will endeavour to show that if a good mantle is required a fair price must be paid for it.

Limits of Explosibility in Gaseous Mixtures.

This is the subject of a letter by Mr. E. P. Perman, of University College, Cardiff, in the current number of "Nature." He says that, making experiments recently on the explosion of gases by means of an incandescent wire, he obtained much wider limits of explosibility than those usually given. The following table shows the numbers obtained:—

	Limits with Incandescent Platinum Wire Per Cent.	Limits (Clowes) Per Cent.
Marsh gas	2·5 to 24	5 to 13
Coal gas	4 to 28	6 to 29
Hydrogen	3 to 75	5 to 72

In each case the gas was mixed with air. The explosion was carried out in a glass tube, about 10 c.c. capacity, having a stopcock at each end, and a mercury gauge of small bore attached to the middle of the tube. When the explosion occurred, the mercury moved more or less sharply, according to the force of the explosion; but a distinct movement, apart from that due merely to the expansion caused by the heating of the wire, could be seen with the proportions of gases given above. The marsh gas was prepared from zinc methyl, as aluminium carbide, on treating with water, was found to give 33 per cent. of hydrogen. Mr. Perman says: "I am not clear as to why the limits should be wider than those usually obtained. Possibly it is due to catalytic action of the platinum wire, or possibly the apparatus is more sensitive than that usually employed. The matter seems of interest in connection with colliery explosions. Using the same apparatus, I have obtained explosions with coal dust and air, and with lycopodium powder and air—no other gas being present."

WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION OF GAS ENGINEERS AND MANAGERS.

Half-Yearly Meeting at Merthyr Tydfil.

Those members of the Institution who were able to journey to Merthyr Tydfil for the meeting last Wednesday must have returned home with the feeling that the time had been well spent. Merthyr is a busy town; and that the Gas Company have faith in its continued and increasing activity, is evidenced by the fact that they have during the last few years erected entirely new works, on a site which allows ample room for future extensions. The growth of the Company's business right on from the earlier years of its existence is well illustrated by the old works, which were added to from time to time, until at last the available ground space would allow of no further expansion. Growing demands for gas at last made it necessary to provide further works; and therefore some five or six years ago a site of about 7 acres was secured on the outskirts of the town, conveniently situated with regard to railway accommodation, and the building of entirely new works was proceeded with. Over these new works the members were taken by the Engineer and Manager, Mr. J. E. Kenshole, who had read a paper earlier in the day describing what had been done. During the inspection, many a word of praise of the works was heard; and Mr. Kenshole was heartily congratulated upon the improved conditions under which it is now possible to carry on the operations of the Company. As an instance of the progress of the undertaking, it may be remarked that Mr. Kenshole has occupied his present position for eleven years; and during this time the output of gas has gone up from 75 million cubic feet per annum to about 130 millions—and it is still growing. Electric street lighting is to be seen in two or three of the main thoroughfares; but the bulk of the public lighting is carried out by means of between 600 and 700 gas-lamps. The old works have now been entirely put out of action, so far as manufacturing operations are concerned; but one of the holders there—of 200,000 cubic feet capacity—is still in use. It will be seen that the gas-works only occupied a part of the proceedings; for there was also the Inaugural Address of the new President (Mr. E. H. Swain, of Pontypridd). In addition to all this, there were some particularly interesting remarks by Mr. R. G. Shadbolt, of Grantham (the President of the Institution of Gas Engineers), who attended the meeting.

THE BUSINESS MEETING.

On assembling in the Bush Hotel, where arrangements had been made for the meeting, the chair was taken by Mr. J. H. Canning, of Newport, the retiring President, who, however, soon vacated the position in favour of the new President—Mr. E. H. Swain, of Pontypridd.

A Welcome.

Mr. Canning remarked that before they began the meeting proper, he would like to extend on behalf of the members a hearty welcome to the President of the Institution of Gas Engineers, Mr. R. G. Shadbolt, of Grantham. They all highly appreciated his presence, which would be a source of great encouragement and satisfaction to them.

Minutes of the Last Meeting.

The Hon. Secretary (Mr. Octavius Thomas, of Pentre) opened the business proceedings by reading the minutes of the meeting held last May at Bargoed; and they were confirmed.

New Member.

Mr. William C. Jackson, Assistant-Engineer of the Merthyr Gas Company, was elected a member of the Institution.

Introduction of the President.

Mr. Canning said the next duty he had to perform was an easy one—namely, to introduce to the members the President for the ensuing year. Mr. Swain was well known to the members. He had been among them a good long time; and he had endeared himself to all by his geniality of disposition and kindness of heart. They also knew what good work he had done in connection with this Institution. It was unnecessary to speak of his professional skill, which was a matter of common knowledge. Mr. Swain would certainly carry out the duties of the office to which he had been elected in the ablest possible manner.

Mr. Swain, who was greeted with much applause, then took the chair.

Thanks to the Retiring President.

The President said his first duty was the pleasant one of proposing a vote of thanks to Mr. Canning for the able way in which he had carried out his duties as President. When he took the chair a year ago, much was expected of him; and it would be freely acknowledged on all hands that these expectations had been fully realized. By hard work, genial courtesy, and great ability, he had shown himself to be a model of all a President should be. He (Mr. Swain) had only one complaint to make, and that was that Mr. Canning's excellent qualities made it rather difficult for the unfortunate man who had to follow him.

Mr. A. H. Brookman (Tenby) seconded the proposal, and endorsed every word that the President had said.

The vote having been carried with applause,

Mr. Canning returned thanks; remarking that he felt the kind words of the mover and seconder, and the vote, were totally undeserved. He felt sure that his successor would do more than he himself had done to make the Institution still more prosperous and of more use to the members than it had been in the past.

The President then proceeded to deliver the following

INAUGURAL ADDRESS.

Gentlemen,—I beg to thank you for the honour you have done me in electing me President of the Wales and Monmouthshire Institution of Gas Engineers and Managers. Let me assure you that, although I am fully aware of my many shortcomings, I very much appreciate being asked to take the chair, and that, relying upon your kindness and support, I will endeavour to fulfil the duties to the best of my abilities. If you are not satisfied with the result, we must apportion the blame between us; yours being that you did not choose more carefully among the excellent material at your disposal.

So many matters have been discussed from time to time from the presidential chairs of various Institutions, that it is difficult to say anything that has not been ably and carefully dealt with elsewhere; and this being so, you will, I trust, forgive me if I take up but little of your time with a few cursory remarks on matters of more or less general interest, so far as they appear to me.

Labour Troubles.

The serious labour unrest (I wish that I could say late unrest) through which we are passing has no doubt caused many of us a good deal of anxious thought; but it is satisfactory to note that though in some instances gas authorities have had to be prepared for trouble from outsiders, they have been able—by readiness for emergency, no less than by the loyalty of their workmen—to keep their operations going on, and to render their usual good service to the public.

To those who are responsible for the supply of commodities such as ours, the sudden withdrawal of which would place a great hardship on every householder, the newer tendency to widen the area of conflict in trade disputes cannot but be regarded as a most serious matter. It would be a calamity if the gas industry—within whose borders we may, I think, claim without much fear of contradiction that Capital and Labour have few (if any) causes of strife—should suddenly, or with but little warning, find itself disorganized, and its workers idle, through the labour troubles of others, into the merits or attempted settlement of which any interference would, of course, be deemed an intrusion.

The sinister practices which have lately taken place seem based upon the idea that "industrial difficulties are the hooligan's opportunity." That these practices should be promptly and effectually suppressed is, I venture to say, equally the interest of both workmen and employers. The respectable workman has no part or lot with the hooligan, whose acts, if unchecked, bring an element of intense bitterness into the discussion of matters which some of us know, from experience, are among the most difficult with which a manager has to deal.

The protection of the means by which the worker will again be employed on the cessation of a trade dispute is, I venture to think, as important to the operative as to the employer. One can conceive, indeed, cases where it is more so, as serious damage to the property may render it impossible for financial reasons to restart. In the case of gas-works, the loss must inevitably and promptly fall on the unoffending public, who, it is well to remind ourselves occasionally, are after all the final judges in these as in all other matters.

A clear recognition of this principle—or duty, if you will—of the divided responsibility for the protection of the common interests of both sides would, in my opinion, go far to solve the problem of how to avoid the employment of either military or imported police.

We have all, I feel sure, nothing but the best of good wishes for the success of those endeavours which are now being made to find a remedy for this unrest. May it be just, generous, and lasting.

The Labour Exchanges have settled down to their work, and are, I feel, fulfilling a very important duty. I am bound to confess that at their inception I was rather sceptical of their usefulness. So far as gas-works were concerned, the almost universal practice of keeping a list of applicants, from which a selection could be made, appeared to me to be all that was wanted, and in my own case had always worked well. I found, however, this work quite taken off my hands; and an energetic and obliging staff of officials at the Exchange in the town I have the honour to serve, has

certainly converted a non-believer in my case, so far, of course, as works of medium size are concerned.

THE SPECIAL PURPOSES SECTION.

May I say a word or two about the Special Purposes Section lately formed as an adjunct to our Association? It is the youngest of all the Commercial Sections, but we hope will not be the least useful. During the first week of their issue, the knowledge derived from a perusal of the weekly coke returns enabled me to recoup my Council's yearly subscription.

It is to be hoped that the section will be well and enthusiastically received. The informal discussion of matters which can be made the subject of round-table conferences is a way of giving and eliciting information second to none. The matters for consideration are so wide in their range, and the interests of undertakings, both large and small, meet at so many points, that no one can attend these meetings without deriving some benefit for the good of the concern he serves. The gas manager has few opportunities of consulting his *confrères*—his difficulties must largely be fought out alone; but here is to hand something which can, in large measure, be looked upon as a remedy for this unavoidable drawback. If we can get our committees to look upon this section as a committee of experts meeting periodically to consult and advise with each other, there will, I am sure, be no trouble about any undertaking joining in. We are somehow just now taking stock, as it were, and considering the value of our District and Central Institutions. It is well that from time to time it should be so; and if the result of this examination should show at any time that reforms of any kind are needed, I think you will find the necessary driving force in the various Commercial Sections which are doing such excellent work up and down the country. At the risk of being a little wearisome, I again very heartily commend the new venture to your support.

ADVERTISING AND PUBLICITY.

The questions of advertising and publicity are much in evidence. The knowledge that we are able to offer to users a better and cheaper light, an indispensable agent for cooking and heating, and an efficient and cheap source of power, has brought about a feeling of fancied security, and an idea that gas will sell itself. Consequently, almost the only advertising which has been done has been carried out through the enterprise and at the cost of makers of various devices for the consumption of gas. Very seldom indeed does one see the advertising pages of the Press troubled with the paid matter of a gas authority. The example of the sellers of certain articles of world-wide fame who find that continuous and striking appeals to the public pay for themselves over and over again, has certainly never appealed to us as worthy of imitation. Yet to reap the advantage of the advertisements which are issued by others, has been our almost only share in the matter—to them the labour and the cost, to us a part of the harvest. It is, I feel, a state of affairs unworthy of a great industry, and may very possibly have conduced in no small degree in earlier days to the action of some firms who, failing to find the support to which they considered themselves rightly entitled, now appeal to our rivals as well as to ourselves. The penalty of this is that the splendid experience which these business firms have acquired, and which has always cheerfully been placed at our disposal, is no longer an asset in our own undisputed possession. From time to time, our excellent Technical Press has given much space to the consideration of these matters, and undoubtedly the Gas Publicity movement, which is, so far as I know, the first attempt on a combined scale to place the merits of gas in an attractive form before the public, should be well and heartily backed up. We should view with the greatest of pleasure a boom in the gas trade should it fortunately follow upon the efforts being put forth; but to keep the ball rolling, good local work is necessary.

Salesmanship in the face of competition is, I think, very peculiarly the province of the proposed Publicity Committee and of the various Commercial Sections. If the Committee could in some way saturate these sections with the necessary principles and practice—whether by means of an expert lecturer or otherwise is immaterial—I feel that the advantage to be gained by the great work they propose to attempt would be greatly enhanced, and placed on a more lasting footing. There are, I can see, some great difficulties to be met before the Committee could deal with the matter; but I think they could be overcome. May I here suggest that the Commercial Sections should get into line with the fashion of the moment and strike for recognition by the Publicity Committee.

It is a little unfortunate for the members of this District Association that the appeal for our own newly-formed Special Purposes Section is so recent as possibly to create a feeling of difficulty in the board-room; and this being the case, I can only plead that each will do his very best in his own particular way.

FUTURE PROSPECTS.

The future prospects of gas must always be of the greatest interest whenever and wherever we meet. It would indeed be strange if it were not so, if only for the fact that our rivals still not infrequently invite us to reflect upon the nearness of our latter end. It is pleasing to be able to say that there is no sign of any disposition to lie down and abandon the field to our competitors, but that there is a very progressive spirit abroad. The enterprise shown in every direction has met with such appreciation from the public that the industry is to-day stronger than ever it was.

A good sign of the times is the favourable reception, and most careful consideration which those responsible for the many new inventions which are placed at the disposal of gas authorities can confidently reckon upon. Ever desirous of reducing the cost of production, they have met with a warm welcome those newer methods of carbonizing and mechanical stoking which, perhaps more than anything else, mark out the line of progress. From the day of the iron retort and the open hearth, the various stages of generator and regenerator settings, inclined and vertical systems all show the sleepless tendency of inquiry and invention which are extant.

The comfort of those whose duty lies in the handling of our crude material in the retort-house, and the necessity for the lowering of costs, have brought about a revolution in methods and appliances. Hand labour, scoop charging, and the simpler forms of labour-saving appliances have given place to power machinery of many types; while the gradual advance in coke-handling, which can be traced from the reign of the "man with a barrow" to the advent of electric telpherage, is an achievement which a few years ago would have been thought impossible.

The engineer who now has the important subject of carbonizing and its attendant operations under his consideration has a vast field of study before him, and never were the temptations to scrap obsolete plant so strong as now.

The extension of improved methods in all other plant on the works has kept pace with that to be seen in the retort-house; and in all departments of the manufacturing part of our business, careful, steady, and persistent advance goes on.

It is a matter of great privilege and importance that the generosity of those responsible throws open to the inspection of the interested engineer the many examples of up-to-date plant which are to be seen. To correct or confirm one's views, as the case may be, is to those souls who, like myself, are perhaps somewhat timid or conservative, a real help; and it speaks well for the good spirit always existing among gas men that the way of the inquirer should thus be made easy. It is of great assistance, also, in counteracting the quiet, persistent pull of the unconsiderate restraining hand of which not all board-rooms are yet rid, and whose baleful effect on the progress of many undertakings is still to be clearly traced.

The various developments which we have already seen, the inquiring spirit, and the high degree of skill which are apparent, give rise to the comforting assurance that the end of inventiveness as regards our appliances is not yet.

LEVELLING-DOWN THE COST.

In this direction, also, it is well to note that the gas manager proper, as distinct from the engineer, has kept "moving with the times." The duty obtained to-day per ton of coal by means of even the old equipment is a vast improvement upon that of a few years ago. Whether by the one means or another, the levelling-down of the cost per 1000 cubic feet has been steady, regular, and widespread. We hear much of the lessened purchasing power of money to-day as compared with a few years ago. It should be a matter of great pride to us that, in spite of the extra costs of materials, wages, and all other services, we can, and do, sell gas cheaper than ever, and that, on the other hand, the conditions and reward of labour are on a vastly improved footing.

HIGH-PRESSURE LIGHTING.

The gradual spread of high-pressure lighting is another welcome feature of the modern spirit of energy. The re-instatement of gas for public lighting in positions which had been temporarily lost to us, and the increasing use of high-pressure lamps for outside shop-window illumination, are both most welcome, as also is the increased attention bestowed upon the use of gas as fuel for domestic purposes.

GAS-HEATING DEVELOPMENTS.

The development of the modern gas-fire has been most marked; and the examples which we now are able to place before our consumers show how successfully the scientific mind has been brought to bear upon the design and construction of this class of apparatus. The complaint has often to be met of dryness of the air in gas-heated rooms. The earlier fires, with their large proportion of convected heat, have given place to apparatus whose design has been arranged so as to reduce this convection and to increase the radiation. In conjunction with this, the lessened consumption of the modern gas-fire has enabled the largest rooms to be heated without extravagance; and it is pleasing to note that the attitude of the public has been an encouraging one.

The rapid strides which have been made by the radiator have been very pleasing. Its increasing popularity is evidence that it has, to use a hackneyed phrase, "met a long-felt want."

The ambition of every good gas manager now is, I suppose, to banish the domestic coal-fire during the summer months. The subject of heating water by gas is one that will appeal to us all. To my mind, this is one of the most important points of advance which are open for our consideration to-day; and I am firmly persuaded that the attention which is being given to domestic gas appliances of all kinds, and the energy which is displayed in the "marketing" of them, will be richly rewarded.

THE COMMERCIAL SIDE.

The forward progressive spirit of which I speak has led to the consideration of many phases of our business, and has thrown a searching light upon commercial matters. If the technical side has shown such steady progress, it is passing strange, and yet none the less true, that the commercial side still leaves much to be

desired. Yet it is plainly to be seen that, if the industry is to show forth at its best against the very severe competition it now has to face, it must prepare itself for a re-organization (or would "creation" be a better word?) of its selling departments.

It is too late in the day to preserve the one-time prevailing attitude that "we make gas for you to apply for." It is necessary to realize that we have an article the sale of which can be pushed with the same good results as to trade done which always follow a good forward policy in every other business. The challenge which our competitors continually throw down as to cheaper and more efficient service, is not to be met by keeping the necessary corrective facts carefully tabulated and locked up. More and more the fact becomes apparent that the weak side has been that concerned with the sales.

It is difficult, perhaps, to lay one's finger upon the exact causes for the flabby commercialism of which I speak. The unfortunate manager whose plea for an extension of manufacturing plant used so often to be made piquant by his recollection of many previous winters' counting of gasholder rivets, may be sure of kindly judgment by his professional brethren when the decision of the powers that be has so often been based on the determination to spend no more money and to try "just one" more winter. To such an one, the summer has meant only a time of hurried preparation for the next much-dreaded winter; and the advent of new districts, streets, or even single customers has awakened some rather mixed feelings. Other undertakings, again, there are whose schemes for extension have been apparently never ending, and whose increased consumption has always been a source of some anxiety as well as pride. No efforts could, of course, be made in the direction of pushing sales. All attention was necessarily focussed upon the manufacture; and, as a natural consequence, many men trained under these conditions, and who are managers to-day, suffered from the lack of opportunity to develop and use their commercial instincts. Can it, then, be wondered at that the display should in many cases be not all we could wish?

We are privileged, however, to see among us the representatives of undertakings of which the powers that be have given earnest attention to this matter; and the success which they have rightly earned and enjoy should act as a healthy stimulant. Their methods of organization will well repay study, and a general adoption of them so far as they may be applicable to the peculiar circumstances of each case cannot but be attended by the most satisfactory results. Without doubt the day of the commercial man in the gas profession is coming; and the sooner he comes into his own, the better for us all. We have a splendid industry. It is strong and capable of expansion, but faced with relentless competition. Let us see to it that it is defended by the use of the best possible business methods.

MAINTENANCE.

A word as to maintenance. By careful manufacture, we may cheapen and improve our gas; by energetic salesmanship, successfully offer it; but if it cannot be used by our customers to the best advantage, then, sooner or later, we must go to the wall. The offering for sale in our show-rooms of up-to-date appliances, the maintenance of lights at lowest cost, and the regular inspection of cookers, are methods (among many others) of dealing with clients which are mutually beneficial, and will appeal to us all. Skilled and courteous attention in this respect makes all the difference between the loss or retention of customers; and as this attention is given under such conditions that very little, if any, supervision is possible, the importance of the proper training of the outdoor staff is at once apparent. This is a problem which has occupied much attention of late, and opportunities for those concerned to obtain the necessary qualifications are being provided by united efforts in many districts. The service of maintenance must be cheap and thorough; all consideration of profit in this department being of a secondary nature—our great object being to secure and retain permanent users of gas.

Thus, briefly, I have endeavoured to bring to your notice a few considerations relating to the future well-being of the gas industry. That we should from time to time carefully examine our position as to progress, and as to that of our rivals, is most essential. To say that we should survey the field of operations to occupy any uncultivated tracts, that we should seek to discover fresh spheres of usefulness, and to seize quickly upon new opportunities for economy and efficiency, is only to point to duties which, judging by the past records and present attainments, will be carried out with great and ever-increasing success.

At the conclusion of the address,

Mr. CANNING proposed a vote of thanks to the President, and said he wished particularly to congratulate him upon the address, which was one of the best to which he had ever listened. It covered a vast extent of ground, and was thoroughly practical. There were contained in it a number of most useful recommendations which they would all do well to ponder over and take to heart. There was one matter to which he would like to refer in connection with the recent labour troubles—and this was that these had been completely obviated, he thought, at gas-works where a scheme of profit-sharing or co-partnership founded upon, or similar to, that inaugurated by the late Sir George Livesey was operating. It was his (Mr. Canning's) opinion that, though very possibly there might be difficulties in respect to its universal application, eventually some such scheme, which would bring about kindlier feelings between employer and employed, might prove to be the salvation of our country with regard to labour troubles to which no solution at present, except the one he referred to, seemed applicable. The President's address was one that would encourage them all, because it reminded them of the progress they had made in the past, urged them to still greater progress, and was full of optimism (and well-founded optimism) for the future. They were in no need of false optimism. They had every cause to look forward most confidently; for there was no reason why the future of the gas industry should not be much greater than its already magnificent past.

Mr. H. D. MADDEN (Cardiff), in seconding, said he was sure they were all much struck with the wide and common-sense view the President had taken in surveying the whole situation of gas administration. Right through, he had "hit the nail on the head;" and the address, if carefully read afterwards, would open out many possibilities of studying the various points raised.

Mr. SHADBOLT asked whether the meeting would permit him at this stage—as one who had known their President for some years now, and, in fact, had known him in another place—to add a few words in support of the resolution, though he was not a member of the Wales and Monmouthshire Institution. The address, to his mind, breathed throughout the spirit of the times in which they lived and laboured. It was Mr. Swain; and when they had said this, they had practically encompassed the whole address. There they had the man exposed to view. His outlook was of the keenest; and the conclusions at which he arrived were of the soundest. To discuss a Presidential Address was, of course, out of the question; but one might emphasize, and possibly be allowed to bring out, as it were, a few of the principal points mentioned; and with their permission, he would like to do this. He congratulated the President and members upon the very active work being carried on in connection with what they called their Special Purposes Section—and what in some other parts was known as the Commercial Section. Undoubtedly, this was a very useful sphere of labour which could not be entered into in a public or semi-public meeting of this character. It was only those who had followed—if even for a short period—the work of such sections who could really appreciate them at their true value. Whether they should be, or were, a recognized spur to apply to the senior body with a view to greater deeds, remained to be seen, and was possibly an open question. But as time went on, it would probably be felt that this section was one of the most useful branches of work; and the President's statement in this connection was one which he (Mr. Shadbolt) would urge those who had not already joined to take very closely to heart. It was remarked in the address that, "We are somehow just now taking stock, as it were, and considering the value of our District and Central Institutions." It seemed to him that this was one of the best signs of life and vitality that they could wish to see. When they became complacent and sat at home or in their offices congratulating themselves upon what wonderful people they were, and how very successfully they were managing their concerns, they were courting danger. Mr. Swain was very well aware of this; and he warned the members. Reference was made in the address to advertising and publicity; and he thought there were few of those present who would not agree that this side of their business had been sadly neglected in the past, for the simple reason that their operations had been so successful. There was no reason why they should not be equally, or more, successful in the future. But the path was more strenuous than it had been in the past, if they would discharge their duty to the undertakings they served, to the public they catered for, and to themselves. The President asked them to heartily back-up the present publicity movement, which, as they were all aware, was rapidly coming to a head. Now, the Wales and Monmouthshire Institution at the present time were not backing it up quite to the extent that he (Mr. Shadbolt) thought they might do. He did not know the number of gas undertakings in Wales, or the membership of their Institution; but might he tell them, without any offence, that up to the present time only nine or ten undertakings in the area covered by the Wales and Monmouthshire Institution had agreed to join the movement? The President had pointed out how little had been done by gas undertakings in the way of advertising. And here, again, he would support him, by asking them to heartily back-up the publicity movement, so that, once it was started, it might be an unqualified success. A meeting which was to be held in London on October 12 to form a suitable body to carry out this work of publicity would be duly announced in the Technical Press. The undertakings that had promised their support would be notified of the arrangements that were being made. A constitution would be proposed at that meeting which, if adopted, would immediately assume the administration of the fund which was being raised by the Institution of Gas Engineers. In addition to this, the present Publicity Committee were so determined that no stone should be left unturned—that no one should be in ignorance of the proposals—that particulars would be published in the Technical Press; so that there would be no excuse for anyone not to know what was intended to be done and how it was intended to be done. Particularly would he lay stress upon the fact that special pains had been taken that due representation might be obtained by every district in accordance with the support which it lent to the movement.

The vote of thanks having been heartily accorded,

The PRESIDENT expressed his gratification at the kind way in which the members had received his address. He feared that what he had said had been only a reiteration of thoughts which had been in the minds of the members already. But perhaps

it was as well that sometimes these views should be collected together in such a form as this. He appreciated very much the remarks of Mr. Shadbolt; and he appreciated his presence at the meeting—both as President of the Parent Institution and as an old personal friend. The members would have gathered, of course, from what Mr. Shadbolt had said, that the support they might give—and which he hoped would be increased—to the publicity movement would be given to a live body. He sincerely hoped that this support might grow on every hand.

Alteration of a Special Purposes Section Rule.

The President then called upon Mr. Canning to move a resolution standing in his name, dealing with an alteration of Rule 2 of the Special Purposes Section.

Mr. Canning remarked that the reason for suggesting the alteration of Rule 2 could be explained briefly. The original rule permitted the co-option of members upon the Special Purposes Section; but it provided that co-opted members should already be members of the Wales and Monmouthshire Institution. It had seemed to some of those upon the Council that they should, if thought desirable, have the power of co-opting from outside—that they should still preserve the power of co-opting within their own body, but that they should not confine their choice absolutely to it. If at any time they thought that somebody outside the Institution possessed an experience in the matters for which the Special Purposes Section was formed to deal, which would be of value and assistance to the section, they wanted to be empowered to co-opt such persons. This was roughly the reason for the suggested alteration at the end of the rule, by omitting the words, "Such persons must be members of the Institution." In addition to this, another alteration had been suggested; but this he would, with the permission of the President, withdraw. If the proposal he now made was agreed to, Rule 2 would read as follows:

> "Membership of the section shall be open to any gas undertakings whose engineer and manager is a member of the Institution, on payment to the Honorary Treasurer of the Institution of the sum of 10s. 6d. in the case of undertakings whose make is below 50 million cubic feet per annum, and 21s. in the case of undertakings whose make is above 50 million cubic feet per annum, upon registration and subsequently upon the 1st of October every year. In addition to representatives so elected, the section may, on the recommendation of the Committee of the section, co-opt persons, not exceeding three in number, who, by reason of their professional knowledge and experience, are qualified to assist in advancing the objects of the section."

He thought it would be an advantage to the section if they had this liberty of choice; and therefore he proposed the amendment of the rule.

The Hon. Secretary seconded the proposition; and it was agreed to.

Report of the Special Purposes Section.

The Hon. Secretary then read the first annual report of the Special Purposes Section. This stated that Mr. Thomas Canning, J.P., was unanimously elected President, and Mr. J. E. Kenshole Vice-President. A number of matters had been considered, ranging from coke and other residuals to evening classes.

The adoption of the report was proposed by Mr. L. G. Langford (Abertillery), seconded by Mr. J. E. Kenshole (Merthyr).

The President said they were anxious to know, of course, whether they were proceeding on the lines the members would wish; and they would be glad of any suggestions or criticism. He would like to say that sad duties had kept him from attending the meetings as he would have wished to do. A great deal of ground had been covered during the year; and they hoped some good would result. They were very anxious indeed that the membership should be extended, and equally anxious that subjects which any member would like to be discussed should be brought to the notice of the Secretary.

The report was adopted without further discussion.

The Merthyr Gas Company and Their Works.

Mr. J. E. Kenshole, the Engineer and Manager, then read a paper on "The Merthyr Gas Company and their Works." This will be found on p. 42. At its conclusion,

Mr. R. A. Browning (Neath) proposed a vote of thanks to the author. He said he had had the pleasure of going over the works and seeing them under construction; and he thought the members would agree when they had inspected them that they were well planned. It must be a great relief to Mr. Kenshole to be in charge of a new up-to-date plant, considering the difficulties he experienced at the old works.

Mr. A. J. Ward (Cardiff) seconded the proposal.

The President, in supporting it, said the paper was a useful one. It was always helpful to read and to theorize on what should be done; but there was a most satisfactory feeling when they heard what had been actually accomplished. The record of skill and care bestowed upon work such as this could not fail to be of very great value; and the reader of the paper was to be congratulated.

The vote was heartily accorded, and

Mr. Kenshole, in acknowledgment, said it had been a great pleasure to read his short paper, and it would be a still greater pleasure to take the members round the works, so that they might see exactly what was being done.

Appointment of a Representative on the Council of the Institution of Gas Engineers.

The President said the next business was the election of a representative on the Council of the Institution of Gas Engineers for the year commencing June, 1912. There was a very good practice in their Institution of asking the retiring President to accept this office. He would be glad if some member would make a proposal.

Mr. Browning proposed Mr. J. H. Canning for the office, feeling sure they would thus be well represented.

Mr. Brookman seconded this; and it was agreed to.

Mr. Canning briefly returned thanks.

Place of Next Meeting.

The President said he hoped they would give him the pleasure of welcoming them at Pontypridd on the occasion of the next meeting. There was perhaps not much to show them there after what they would see at Merthyr; but they would be warmly welcomed, and he hoped there would be a good attendance.

On the proposition of Mr. Kenshole, seconded by Mr. Canning, it was agreed that the next meeting should be held at Pontypridd.

Thanks to the Gas Company

The President said he thought they could not do less than tender a hearty vote of thanks to the Chairman and Directors of the Gas Company for their invitation to Merthyr, for providing a room for the meeting, and for their hospitality. A society such as theirs, which had no settled home, could appreciate most heartily such hospitality when extended to it. The members felt that it was a recognition of the work which they, in their corporate capacity, tried to do, by those from whom such recognition was most welcome. He proposed that a hearty vote of thanks be given to the Chairman, Directors, and Engineer of the Merthyr Gas Company for their kindness that day.

Mr. F. C. White (Treharris) seconded this; and it was cordially agreed to.

And the Hon. Secretary.

The President said that Mr. Octavius Thomas should receive a most cordial vote of thanks was always a feature of their meetings; but though it had become a custom among them, it never degenerated into formalism or a perfunctory matter. They felt that in Mr. Thomas they had each and all a good friend, and the Wales and Monmouthshire Institution the very best of Secretaries. No trouble was too much, and no matter too little, for him to tackle. When he (the President) left Yorkshire some five years ago, a friend of his there urged him to seek the friendship of Mr. Thomas. "You will find him," said he, "the straightest man you ever met, the best of good fellows, and one who has not an atom of unkindness in his whole nature." All this he now knew of his own experience to be true of their Secretary; and he could not add or say anything better. He moved that their heartiest thanks be given to Mr. Thomas.

Mr. Canning, in seconding, remarked that Mr. Swain's Yorkshire friend undoubtedly knew something in giving him the advice he did. They were all indebted to Mr. Thomas for many acts of kindness.

The vote having been carried with applause,

The Hon. Secretary acknowledged it, and suggested that it would be of great assistance to him if some member would volunteer a paper for the next meeting.

This concluded the business.

The Luncheon.

The members then adjourned to luncheon in the hotel, on the invitation of the Chairman and Directors of the Gas Company. One of the Directors—Mr. V. H. Thomas—presided, in the unavoidable absence of Mr. H. P. Linton, the Chairman of the Company. After lunch, there was some interesting speech-making.

The Loyal Toast having been duly honoured,

Mr. J. H. Canning proposed "The Institution of Gas Engineers." It was not, he said, necessary, in a gathering like the present, that he should enlarge much upon the aims and objects of the Institution. They were well known to all of them; but still perhaps one might refer slightly to the work now being carried on by the Institution, and compare this work with what was carried out by them only a short number of years ago. His own acquaintance was first made with the Institution, he thought, as a boy of eleven or twelve years of age. It happened to be at the memorable meeting at Glasgow before the split unfortunately took place in the forces of their industry; and it would be very instructive to compare the programme of that meeting with the programme of one of the more recent gatherings. Since that time, of course, the competition of electricity had produced an entire revolution in the methods of the gas industry; and in consequence the Institution had had to adapt itself to meet the requirements of the present day. There was no surer sign of the vitality of an Institution than its capacity for adapting itself to new conditions. As they were all aware, at the time of the French Revolution the Government of France was too rigid or not elastic enough to adapt itself to the new conditions; and so it had been swept away. It had not been so, however, with the premier Institution representing the gas industry, which had adapted itself well to modern conditions. It had stood well all the tests that had been applied to it; and it was perfectly ready now, under the presidency of Mr. Shadbolt (whose name he wished to couple with the toast), to meet all that might be required of it. With regard to Mr. Shadbolt himself, his name had been a household word in the industry for many years past. They all knew his ability; and under his able

presidency the coming year of the existence of the Institution of Gas Engineers would be as full of benefit to the industry as any that had preceded it.

Mr. SHADBOLT said he was getting almost accustomed to responding to this particular toast. Mr. Canning had referred to the adaptation of the Institution of Gas Engineers to altering circumstances; and he might have referred to the necessity for the adaptation even in the person of the President to the changing conditions of the times in which they moved, because so much was expected of one—and justly so. If they considered that, not only was the form of their annual programme so considerably altered since the time Mr. Canning referred to, but also that their interests and their connections had become more complex. At that particular time, the District Associations which existed were very different from what they were now. At the present time, they found the District Associations of the country, including the Welsh, and Irish, and Scotch, all closely and actually affiliated with the Parent Institution; and when they considered this fact, they could imagine without any great mental effort the great change that had gradually come over the organizations of their industry. This change was only the beginning of things. First they had disruption; then amalgamating and uniting of forces; then a further uniting in connection with affiliation; and now they were looking forward to the next move. This spirit of adaptation, he believed, permeated all ranks—from the Commercial Sections of the District Associations to the Council of the Institution themselves. Through the representatives sent to the Council by the District Associations, the central body were now closely in touch with every corner of the country. At a full Council meeting, they had representatives from no less than eight District Associations. He would not refer any further to publicity; but there was one movement which must inevitably sooner or later follow on this. This was the movement alluded to by Mr. Helps in the course of his Presidential Address to the Institution of Gas Engineers—the widening of the basis of the national organization. Whatever form it might take—and as to this he would not venture to prophesy—they might depend upon it that the publicity movement which was now about to take concrete form was only the forerunner of something else. The time had gone by when the onus of looking after their industry must devolve upon the technical officials only. Why should the technical officials of any undertaking bear the brunt of promoting the welfare of the industry? So long as they qualified themselves to discharge their duties, and fitted themselves for all the demands that could be made upon them, this was all that could reasonably be expected of them. Much greater sinews of war were needed than they had yet been provided with before they could attend to the requirements of the industry and pave the way for its further advancement, as they ought to do. It was one of the richest industries in this country; and yet they found themselves holding back because of that great mass of inertia which must sooner or later give way to the needs of the times and enable the industry to go forward and fill its proper sphere. They saw the signs of what they were running up against every day; and their Institution, which claimed to be the premier body in connection with the gas industry, comprised at the present time not many more than 800 men, who represented they might say an industry with a capital of, possibly, £140,000,000 to £150,000,000. They did not represent it; they only represented the technical side of it. This publicity movement was one in which officials of all kinds must have a part and must have a voice. They must assist in helping forward the industry—in making the industry what it really could and what it really ought to be. The gas industry had been with the public so long, and served them in so unostentatious a manner, that they really were not taken seriously. When they attempted to enlighten the public as to what the gas industry did, and when they fell into line with other industries, and made people realize the value of the service they rendered, then, and not until then, would the public appreciate what was done for them by the gas industry. To do this, necessitated bringing every interest into line. There they had before them a great work, in organizing the various interests of the industry on a broad basis, where there would be room for all and exclusion of none. Such a basis was of the style of that which the present signs foretold. Many of them were very conservative, in that they did not like the idea—those who were engineers and managers—of (say) the secretary coming to their meetings. They would say the secretary had nothing to do with the technical part of the business, and only came to pick up wrinkles. There were others—he was one of them himself—who liked to mingle a little pleasure with the serious business meetings; and possibly they might not always care to have their chairman present on these occasions. [Laughter.] But there was not the slightest reason why these different branches of administration of the gas industry should not pull together for the same result, and why they should not be organized thoroughly and work on their own particular lines. This was what they had immediately facing them. And if in the course of time they could bring this matter to a successful issue, they would have fulfilled Mr. Canning's prophecy that their future would be greater possibly than their past or present. This was the great question which was before them; and he asked them on behalf of the premier Institution to give it consideration, so that when it came up for discussion their representative on the Council might be able to say that the opinion of the Welsh Institution was that the thing should be done on these or those lines. He thanked them for the way in which they had proposed and accepted the toast of the Institution of Gas Engineers.

The CHAIRMAN proposed "The Wales and Monmouthshire District Institution of Gas Engineers and Managers." Every profession, he remarked, possessed an organization similar in character to this one; and he did not think it was possible to exaggerate the value of such bodies. They gave the younger men an opportunity of coming and exchanging views with others of riper experience, and of getting hints they would not otherwise be able to obtain easily. He knew that in these Institutions help and advice were readily given by the seniors. He had not had the privilege of being present at their business meeting that day; but he had heard the last speech, and he felt sure that if they had come to hear that alone their time would not have been wasted. He wished them every prosperity, and was glad they had taken the opportunity of coming to Merthyr. In the name of the Company, he offered them a hearty welcome.

The PRESIDENT, in responding, said they were all much indebted to the proposer of the toast for the kindly things he had said, and for his good wishes for the welfare of their Institution, which they had all so much at heart. The interest they took in each other's doings—the records of which were most willingly laid bare on these occasions—had led to what had been happily termed "competition by comparison." They met together from time to time, combining mutual self-instruction with pleasure; and the measure of their success was the applicability of the resulting information to the various undertakings in their charge. Thus they performed at once a pleasure to themselves and a duty to the public. They recognized that not all the knowledge was contained in one head, and acted accordingly. Their Institution was as yet young; but it had already become part of the life of the gasmen of Wales and Monmouthshire. Looking around upon those present, he felt no fear as to the future. Continuing, he proposed "The Merthyr Gas Company," who, he said, had deserved well of their town. They had rendered a good public service for many years; and in erecting splendid new works, they had given an earnest of their opinion that Merthyr was not dead yet by a long way. In providing room as they had done for future increases of business, they had shown their belief both in the future of Merthyr and in their own. It was evident from the progress of the Company and the enterprise displayed by them, that Mr. Kenshole had a Chairman and Directors who took an interest in what he did, and who were themselves abreast of the times.

The CHAIRMAN, in reply, expressed regret at the unavoidable absence of Mr. Linton and the other Directors. He hoped the members would approve of the new works when they saw them.

Mr. KENSHOLE also returned thanks. He remarked that it had been his privilege to serve the Company as Manager for eleven years; and he did not think he had ever yet received a cross word from any one of the Directors.

VISIT TO THE NEW WORKS.

The company then proceeded, under the guidance of Mr. Kenshole, to the new gas-works. There was much here of interest to the members; and the visit was the more enjoyed from the fact that they had earlier in the day had described to them by Mr. Kenshole (see p. 42) that which was to be seen there.

GAS LIGHTING AT THE TURIN EXHIBITION.

Installation of High-Pressure "Pharos" Lamps.

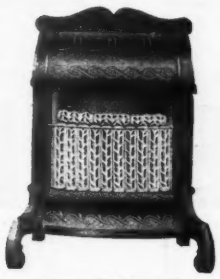
Those of our readers who have visited the Turin Exhibition will, of course, have noticed the fine installation of high-pressure gas lighting with "Pharos" lamps which has been carried out by the Consumers' Gas Company of Turin. According to some particulars given in a recent number of "L'Industria," the installation comprises 205 lamps (supplied by the Deutsche Gasglühlicht Aktiengesellschaft), mounted on 185 posts, supporting one, two, or three lamps. Of the total number, 188 lamps are of 1000-candle, 15 of 2000-candle, and two of 5000-candle power; the total light-giving capacity being 228,000 candles. The "Pharos" light is produced by compressed gas or compressed air; but preference is given to the latter for public lighting when there are no private consumers, and especially where there are no pipes in existence, as the expense of duplicate piping is avoided. The plant now in use at the exhibition, being intended solely for the illumination of open spaces, was, for the sake of economy, constructed for compressed gas.

There are three compressors—one with a capacity of 230,000 candles, and two of 75,000 candles, working at the rate of 500 revolutions per minute. They are belt-driven from an alternate-current electric motor, at 500 volts. The burners are inverted, and are furnished with suitable regulators. They are so arranged that the light is projected and evenly distributed within a considerable radius without producing shadows. They give a brilliant white, but at the same time warm, light, having very few of the ultra-violet rays so injurious to the eyes; and they are much more powerful than ordinary burners. Compared with electric arc lamps, the "Pharos" system is more economical, because the lamps can be mounted on standards and brackets, as well as suspended. Their ignition is simultaneous and automatic. The mantles have a life of about 150 hours; and cleaning is done every eight or fifteen days. This is a distinct advantage compared with electric arc lamps, which require cleaning and the renewal of carbons daily.

The economy in cost of maintenance and the small consumption of gas with the "Pharos" system (0·41 litre and 0·39 litre per candle-hour respectively for the three and two burner lamps) allow of a considerable reduction of expense being effected in comparison with other systems of lighting—viz., 40 to 50 per cent. in the case of electric incandescent and arc lamps, 50 to 70 per cent. in that of metallic filament lamps, and 80 to 90 per cent. with carbon filament lamps. The installation at the exhibition has, it is stated, given the utmost satisfaction.

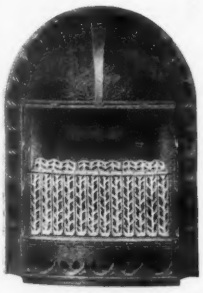
Lighting of the Scottish Exhibition.—Mr. J. Richard Milne writes to draw attention to an error in our report of the lighting at the Glasgow Exhibition in the "JOURNAL" for Sept. 19. The three "Nonpareil" burners in the Concert Hall are, he says, supplied with gas under town's pressure and not with high-pressure gas as was reported.

The "MASCOT."

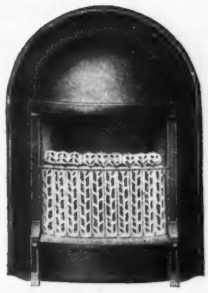


The "GELERT."

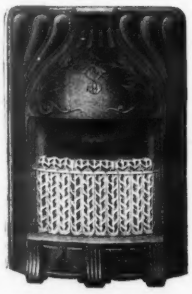
The "TALISMAN."



The "WIZARD."

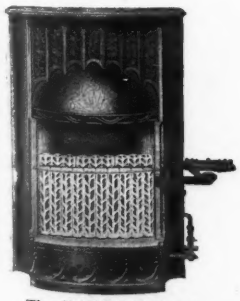


The "MERLIN."

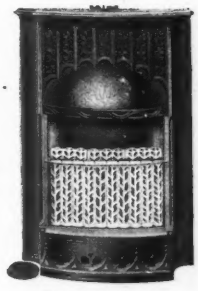


The "WARLOCK."

The "FORUM."



The "ARCHDRUID."



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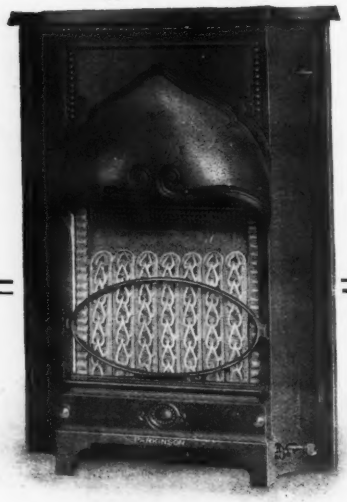

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EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

Half-Yearly Meeting at Felixstowe.

A bright bracing day was last Friday, at Felixstowe, when the members of the Association met there, under the presidency of Mr. F. M. Paternoster, the Engineer and Manager of the Gas Company serving the town, and serving it well and actively. The temptations to stay there were many; and arrangements had been made by several of the members and their ladies to spend the week-end in the town, and occupy the time exploring its surrounding beauties.

On Friday, the *rendezvous* was the Felix Hotel; and there at one o'clock the members were entertained to luncheon by the Chairman and Directors of the Gas Company. It is only a few years since the members were at Felixstowe; and then they received similar hospitality. This early repeated kindness and interest were much appreciated by the visitors. At the luncheon, on this occasion, there were at the head table and among the guests not only the Directors of the Company, but several gentlemen of local official standing. The Chairman of the Company (Mr. S. Alexander) presided; and on his right and left hand sides were the President of the Institution of Gas Engineers (Mr. R. G. Shadbolt) and the retiring President of the Eastern Counties Association (Mr. J. W. Auchterlonie). The Vice-Chairman of the Company and Chairman of the District Council (Mr. E. H. Woodmancy) was there, as well as the other Directors, Mr. T. E. Priestman, Mr. T. Ward, and Mr. Worthington Church. The Company's Solicitor (Mr. A. J. Howard) was at the table; and the town was represented by Mr. D. J. Cowles, J.P., Chairman of the Lighting Committee, Mr. H. Clegg, Surveyor, and Mr. Napier Prentice, the Electricity Supply Company's Engineer. There were several others—too many, in fact, to name individually. The retiring Secretary of the Association (Mr. T. A. Guyatt, of Ely) and the new Secretary (Mr. J. Davis, of Gravesend) were also there. Mr. Paternoster looked after the large company with the vigour he always displays over all matters that he takes in hand. After luncheon, the loyal toast was honoured; and then

The CHAIRMAN offered the visitors a hearty welcome. He remarked that it was not often a town was honoured with the presence of the Association with so few years intervening between one visit and another. But the Directors of the Company esteemed it a twofold pleasure. It might be taken that the first visit of the members was so pleasant that they wanted to come to them again, though he had no doubt the primary object of the gathering there that day was to do honour to their Manager. Would those present allow him (the Chairman) to say that, having been in almost daily contact with Mr. Paternoster since he became the Company's Manager ten or twelve years ago, he had found it ever to be a pleasure to be associated with him. [Applause.] They had had, as the members were aware, a very arduous task in reorganizing their plant at the gas-works; and they had had great difficulties with which to contend. The first was that the works were built on the bed of a river. Consequently, it had been very difficult to get good foundations for their regenerative settings, and for the whole arrangement of the plant. He was glad so many of the members had been to the works that morning; and it was a pleasure to the Directors to hear what their visitors thought of the plant. He was glad to think, from what he had heard, that they all thoroughly endorsed the action the Company's Manager had taken, and the wisdom he had displayed in the work. It had been to the Directors a great satisfaction that Mr. Paternoster had, with such ingenuity, forethought, and adaptability, obtained for them works, which he (the Chairman) thought would stand them in good stead for some few years to come. If he might be further allowed to say so, the members, in honouring Mr. Paternoster by electing him as President, had selected a young man who had got his head screwed on the right way. They had in the town a keen electrical competition, financed by the Council; and consequently the Company had great competition to deal with. But the Directors were quite satisfied there was scope and room for the two competitors; and the Gas Company would be pleased to run side by side with their electricity rivals. It was said that their friends could do cooking by electricity as cheaply as by gas, but they had a good bit to do before that would happen. At the Electrical Exhibition now being held at Olympia, he understood that Messrs. Lyons and Co. would not permit, as caterers there, the cooking to be done by electricity; they insisted upon using gas. Gas could hold its own for lighting, cooking, and heating, and for street lighting. The future of gas was a proud one; and in the presence of the Manager of the electricity works, he could also say that there was a great future for electricity. He trusted they would work harmoniously together. On behalf of the Directors of the Company, he repeated that they were pleased to see the members present; and he hoped they would have a happy visit.

The VICE-CHAIRMAN (Mr. Woodmancy) observed that though it was not a long time since the Association visited Felixstowe, he was quite sure the members would find considerable improvements had been made in the town in the short interval. He remarked upon the beauties of the town and district; and he incidentally mentioned that, as Chairman of the Council, he had been asked to start, and had started, the new engine at the electricity works. This was, he thought, rather a unique position for the Vice-Chairman of a Gas Company to be in. The members would find the electrical plant in thorough good order, and up to date; and if any gas undertaking was thinking of adding the production of electricity to their business, he was sure their Electrical Engineer (Mr. Napier Prentice) would be pleased to render assistance, and show how electricity was generated noiselessly and odourlessly. [Laughter.] He also spoke about the excellent condition of the roads, which were a great credit to the Surveyor and to the Corporation. The President-Elect of the Association also took a little credit; for he, along with the Surveyor, had concocted a tar dressing for the road surfaces.

Mr. AUCHTERLONIE (the retiring President), said, on behalf of the members of the Association, he should like to state how much they appreciated the words of welcome that had fallen from the Chairman and Vice-Chairman, and the generous hospitality of the Company. As had been said, it was only three-and-a-half years since the Association last visited Felixstowe; and the members were then highly delighted with their visit. The visit on this occasion was largely due to the fact that their esteemed and respected friend Mr. Paternoster had been elected to the presidential chair of the Association; and the Directors of the Company magnanimously again extended to the Association an invitation, which the members were only too happy to accept, although they felt they were rather encroaching on the hospitality of the Company. However, they were glad to have the opportunity of again visiting such a charming town. He also congratulated the Company on their works, and concluded by asking the members to drink to the health of the Chairman and Directors of the Felixstowe Gas Company.

The CHAIRMAN briefly but sincerely acknowledged the toast.

BUSINESS MEETING.

The Business Meeting was subsequently held in another room in the hotel. At the opening of the proceedings, the retiring PRESIDENT (Mr. J. W. Auchterlonie) was in the chair.

PRESIDENT OF THE INSTITUTION.

The PRESIDENT said he should like, in the first place, to offer a hearty welcome to the President of the Institution of Gas Engineers, Mr. R. G. Shadbolt, of Grantham. The members were all pleased to see him present; and as this was the first opportunity as an Association they had had of congratulating him on his election to his high office in the British gas industry, they took advantage of it most heartily. Further, he thought the members would like to wish their friend the health and strength necessary to carry out his arduous duties during the coming year. With health and strength, he thought Mr. Shadbolt's natural ability and discretion would bring to him a successful year of office. In the name of the Association as a body, he congratulated him.

Mr. SHADBOLT asked to be allowed to at once acknowledge the graceful remarks the President had uttered. If anything were needed to spur him on with regard to the work which lay before him as President of the Institution of Gas Engineers, the President's remarks, and their endorsement by the members, had given him the necessary fillip. They had before them as an industry, as well as an Institution, a very arduous year. There was a great deal of work to be done—a great deal of spade and developing work. And so long as one felt he had the support of the District Associations of the country—such support as the President had indicated by his remarks—one was convinced that the work would prosper, and one's duty to all concerned was simply to peg away and try to discharge the duties of office to the best of his ability, feeling he had behind him the support and good wishes and the real assistance of the members of the various District Associations.

MINUTES.

The SECRETARY (Mr. T. A. Guyatt, of Ely) read the minutes of the last meeting, which were at once confirmed.

NEW MEMBERS.

Moved by Mr. JOHN YOUNG (Hull) and seconded by Mr. J. DAVIS (Gravesend), the following gentlemen were added to the membership: *Members:* Mr. H. Wilkinson, of Slough; Mr. J. W. Turner, of Scunthorpe; and Mr. E. Topley, of Tottenham. *Associate-Members:* Mr. F. C. Sugden, of Leeds; Mr. C. W. Church, of Felixstowe; and Mr. C. W. Thomas, of Stourbridge.

DISTRICT REPRESENTATIVE ON THE INSTITUTION COUNCIL.

The PRESIDENT proposed that Mr. Paternoster be the District Representative on the Council of the Institution of Gas Engineers. It had been in the Association an unwritten law—and it was one that had acted well in the past—that the President for the year should represent the Association on the Council of the Institution. He (Mr. Auchterlonie) therefore proposed that Mr. Paternoster be the representative of the Association Council. He was sure that the President-elect would throw his whole energy and ability into the work.

Mr. H. WIMHURST (Sleaford) seconded the motion.

Mr. PATERNOSTER thanked the members for the honour done him in electing him as their representative on the Council of the Institution. He should make it his duty to worthily represent the Association on that body.

Mr. AUCHTERLONIE said this completed his year of office; but before inviting his successor to take the chair, he should like to thank the members for the cordial support they had given him during his own year of office. He, with full confidence, asked the members to extend to his successor the same support as he had

himself received; and he was sure the Association would prosper in the future as it had done in the past. He then called upon Mr. Paternoster to take the chair.

THE NEW AND THE RETIRING PRESIDENT.

Mr. PATERNOSTER took the chair amid applause.

The PRESIDENT said his first duty in taking the chair was to propose a cordial vote of thanks to Mr. Auchterlonie. He had been an ideal President. The Association had prospered considerably under his control; and he was sure the members would miss him from the chair. He (the President) should require a good deal of his support and assistance during his year of office. As a slight memento of his year of office, he should ask him to accept the President's medal, which he trusted he would wear; and when he looked at it, as he probably would frequently, he would remember the happy times he had spent in the chair of the Association. He asked Mr. Auchterlonie, in the name of the Association, to accept the medal.

Mr. AUCHTERLONIE, in acknowledgment, thanked the President for the kind words he had used in presenting the medal, and the members for it. Regarding his humble efforts during his year of office, he was quite aware of his own shortcomings. At the same time, he had found considerable pleasure in the work, and it had been an educative experience. In his opinion, all the younger members of the Association would do well to aspire to the office. He could only wish Mr. Paternoster as pleasant a year of office as he had had. He thanked the President for his kind remarks, and the members for the way in which they had received them.

The PRESIDENT then read the following

INAUGURAL ADDRESS.

Gentlemen,—My first duty is to thank you all, and to express my sincere appreciation for the great honour you have conferred upon me by electing me as your President; and I trust when my term of office expires you will not feel that your confidence has been misplaced. I am one of the younger members of the Association, and the works of which I have charge certainly cannot be numbered with the largest or the most important in the district. So I naturally feel somewhat diffident in addressing an assembly in which there are so many who can justly be considered my superiors in experience and knowledge of the gas profession. I have on several occasions presented papers at the meetings of the Association; but the magnitude of my task in preparing this Presidential Address has, during the last few months, made me realize my own deficiencies, and I have more than once doubted whether I am capable of submitting matter worthy of the traditions of the Association.

It is the usual admission of every President, as he takes the chair, that his predecessors have made it very difficult for him to follow in their footsteps; and until my turn came to prepare this address, I did not realize how difficult it was to maintain the high standard of efficiency set by those who occupied the chair before me. I earnestly solicit your sympathy for my shortcomings.

I must ask the Technical Press to be considerate and not too critical of my effort to add something worthy of inclusion in the "Transactions" of the Association. I wish, also, to express my gratitude for the knowledge and assistance I have been able to gain by the study of the valuable matter which they serve up week by week, which undoubtedly results in great benefit to the industry in general.

In arranging my ideas, I find it difficult to avoid following examples set by other Presidents of this and similar Associations; but I will try to place them before you so as not to be accused of plagiarism. I will also endeavour to be concise, and avoid all unnecessary padding.

POSITION OF THE INDUSTRY.

As responsible officials, we all have need to be proud of the present position occupied by the gas industry. Its prospects were never brighter, and the popularity of gas stocks as an investment show clearly that the public have no fear for the future. Employees are for the most part contented with their lot. We have been almost unaffected by the recent labour troubles; and despite the high price of coal and the competition of electricity, the price of gas is constantly being lowered, and was never more in favour with the public as a means of obtaining light, heat, and power.

LABOUR QUESTIONS.

The labour question throughout the country is to-day a very serious one, and we cannot expect the cloud to pass without at least some indirect influence upon the gas industry. The gas worker is no doubt, in the majority of cases, an exception in that he is not sharing in the general state of unrest; and it behoves us to maintain that good feeling which is in existence. By this statement, I do not allude to the rates of pay; for as a whole I believe that gas workers are of a class who recognize that they have such advantages as permanent employment with a good and regular wage. We all, without being accused of socialistic tendencies, can and must sympathize as much with the underpaid working man as with those of our own profession who are expected to manage a gas-works for a wage little higher than that of a stoker. I do think, however, that we should use our best endeavours to ensure that the men shall work under the best possible conditions, and have every possible facility to enable them to perform duties which are often of a particularly arduous and special character.

The spread of co-partnership and sick and superannuation funds is a highly satisfactory sign, binding shareholders and employees together to the common good; and I would it were possible to see these movements so extended that every gas employee might feel he has no need for National Insurance, and that the company he serves might be exempted from proposals which must undoubtedly increase the burden of both. On the matter of sick and superannuation funds, I was particularly impressed with the suggestion made by Mr. F. W. Cross, of Lea Bridge, in his letter to the Press, that a National Gas-Workers Mutual Provident Society should be registered and secure approval under the National Insurance Bill. I do not see any reason why a serious attempt should not be made to take this matter in hand.

SALARIES OF OFFICIALS.

One thing we have to deplore is the poorness of the salaries sometimes offered by companies and corporations when inviting applications for positions as responsible officials in their gas undertakings. It is not at all unusual to see an advertisement in the newspapers inviting applications for the post of manager of a medium-sized gas-works; the salary offered being as low as, and even lower than, that usually paid to a foreman on most works of similar size. Surely the time has come when it is necessary to find some means by which a gas manager can be assured of a salary commensurate with the responsibilities of his position.

MANUFACTURING NOTES.

The price at which we can obtain the necessary raw materials must always to a large extent affect the price at which gas can be produced; but though the coal market is probably not so favourable as we should like to see it, yet the continued improvements made in manufacturing processes, and the present satisfactory state of the market for residuals, inspires us with the confidence that there can be no fear of any reduction in profits likely to affect the prosperity of the gas concerns of the country.

The recent developments in carbonizing plant make it difficult for a gas manager to decide upon the most suitable method to recommend his directors to adopt when considering the question of new works or extension of the retort-house. The vertical retort-setting has without a doubt come to stay; and although it appears to be the most desirable form of plant, many of us feel that the last word has not yet been said for horizontals. A large number are, I think, still sitting on the fence with regard to this matter; and, personally, I do not feel satisfied that the vertical retort is suitable for small works.

Last April, I described the installation of a bench of horizontal retorts at Felixstowe; and on the present occasion I propose to make only a brief allusion to this plant. Since then two additional beds, of six retorts each, have been completed, and have been at work some weeks, with satisfactory results. The contractors for the work gave excellent guarantees for both the new settings and those installed in 1910; and so far as fuel consumption and make per mouthpiece are concerned, I have no present cause for complaint. With regard to the life of the retorts and the regenerators, they have not yet been at work sufficiently long for me to express an opinion. We use principally Durham unscreened gas coal; and the guarantee was a make of 9000 cubic feet of gas per mouthpiece, with a fuel consumption of 12 lbs. of coke per 100 lbs. of coal carbonized. The retorts are 22 in. by 16 in. ⏢'s, 10 feet long inside; the charging being done with hand scoops. When the two beds installed in 1910 had been at work for some weeks, and the proper adjustments had been decided upon for air-slides and dampers, it was found under test that the capabilities of the settings had not by any means been over-estimated; the fuel consumption working out at between 11 and 12 lbs., and the make per mouthpiece reaching the required figure, though, owing to the high heats and heavy charges which are necessary to obtain the latter, I make no pretence of maintaining this working with manual labour, unless under exceptional circumstances. The tests of the beds of six recently installed have not yet been completed; but I have no reason to doubt but what they will give the same excellent results.

WATER-GAS PLANT.

Referring to water gas, I have on a previous occasion mentioned that my Directors installed a plant before commencing the rebuilding of the retort-house; and at this point I propose to say a few words on its usefulness under such conditions as exist at Felixstowe. At most seaside resorts, more gas is sent out in the month of August than in any other month during the year—July and September also being heavy months. This naturally means that the production of coke is heaviest when there is practically no sale for it; and a large stock is collected at an inconvenient time. For this reason alone a water-gas plant of some description is a most useful addition to the carbonizing plant. It enables the stock of coke to be kept down when the market price is low, and at the same time there is a supply of the raw material to make water gas when it is most required. A blue water-gas plant was selected, because I felt that it would give sufficient assistance for some time to come. There was a suitable building in existence on the works, also a convenient holder, in addition to which purifiers, exhausters, &c., were not required; so the outlay was a small one. The plant is arranged so that at any time it can be converted to a carburetted water-gas plant, should it be considered necessary to increase the percentage of water gas rather than add to the

coal-gas plant. In this way it may also assist in economy in the matter of holder accommodation.

The water gas passes direct from the plant into the storage holder, and is drawn from there as required into the foul main in the retort-house; the stream being regulated and measured by a rotary meter. From the outlet of the meter there are two pipes, which, before being connected to the foul main, are passed through the main flue of the settings; the water gas thus being raised to a temperature equal to, and generally above, that of the coal gas—usually about 120° Fahr. I have found that to obtain the best results the temperature of the water gas must be at least equal to that of the coal gas at the point of admixture; and under these conditions, from about 10 to 15 per cent. necessitates very little enrichment of the mixed gases. The mixed gases are sent without enrichment through the whole of the purifying apparatus into the storage holder, and, if necessary, enriched with benzol on the inlet of the station governor before being sent on the district. We keep a careful record of the benzol used day by day, and also make frequent testings of illuminating power and calorific value. I give below a few figures which I think will be of considerable interest.

Mixture of Coal and Blue Water Gas.

Tests made over a period of three months.

Maximum percentage of water gas mixed	18·87
Minimum " " " "	3·38
Average during period	11·73
Maximum calorific value (11·63 per cent. water gas)	553·8 B.Th.U. net.
Minimum " " (18·56 " " " ")	489·1 B.Th.U. net.
Maximum quantity of benzol (14·04 per cent. water gas) used per 1000 cubic feet of mixed gas	0·1416 gallon.
Minimum quantity of benzol (13·94 per cent. water gas) used per 1000 cubic feet of mixed gas	0·0199 gallon.
Average quantity of benzol used per 1000 cubic feet of mixed gas during test	0·0675 gallon.
Average make per ton of coal during test	11,245 cubic feet.
Average candle power of mixed gas No. 2 burner	15-candle power.

Quality of coal carbonized—two-thirds Durham unscreened, one-third screened nuts.

These tests were made during the use of direct-fired setting in the retort-house. During the recent month of August, the mixture contained an average of 9 per cent. of blue water gas. For twenty days during the month the percentage was over 10 per cent., the maximum being 15·2 per cent.; and the quantity of benzol used for enrichment averaged 0·0140 gallon per 1000 cubic feet of the mixed gases. The make of coal gas per ton was 11,532 cubic feet. The quality of the mixed gases was kept up to about 15-candle power, tested with the No. 2 burner, and the calorific value to about 510 B.Th.U. net. I should also mention that there is only one holder for the mixed gases; and having to work continually in and out of this holder, with the inlet and outlet pipes side by side, makes it, in my opinion, sometimes necessary to use a larger quantity of benzol than would be the case with an additional storage holder.

ILLUMINATING POWER.

In regard to illuminating power, we are favoured by the close attention of an inspector employed by the Council, as, in addition to the photometer at the works, the Council keep one constantly in use at the Town Hall, where also the Company have a photometer upon which the official tests are made when notice is received from the inspector. I am glad to say that the regular testings on behalf of the Council are generally so satisfactory that the official tests are few and far between. The standard is 14-candle power tested by the No. 2 burner.

DEPOSITS IN WORKING PLANT.

Before leaving the subject of manufacture, I should like to refer to a matter brought to my notice while reading the report of the recent meeting of the Waverley Association of Gas Managers, when the President made mention of a substance which forms in the hydraulic main at the works under his charge. There was considerable discussion among the members as to the cause of the trouble, also as to the nature of the deposit; the opinion being expressed that it was principally ammonium chloride.

A short time after reading the report, I was troubled with a deposit in the hydraulic mains, liquor pumps, and liquor pipes on the works; and I had several conversations with the Inspector of Alkali Works as to its composition. The water supply for the hydraulic mains and washing plant is obtained from an artesian well on the works; and the following is an analysis of the water.

Analysis of Water from Artesian Well.

	Grains per Gallon.
Free ammonia	0·084
Albuminoid ammonia	0·002
Chlorine in chlorides	483 = sod: chloride 792
Solids in solution dried at 212° Fahr.	982
Hardness before boiling	143·5 almost entirely permanent.

I was endeavouring at the time to improve the results obtained from the sulphate of ammonia plant; and I questioned the Inspector on the advisability of using this water for the absorption of ammonia. He very kindly offered to have an analysis made of the deposit I had found; and the following is a copy of the report which I received from the Chief Inspector of Alkali Works.

1.—*Sample from Suction Pipe of Liquor Pump.*—Consists essentially of magnesium carbonate associated with a small quantity of ammonium carbonate. Chloride, practically absent; and sulphate, ditto. Iron oxide, traces. Sulphide, traces (query, present as Fe S). Calcium carbonate, traces. Combustible matter present in small amount.

2.—*Sample from Hydraulic Main.*—Consists essentially of calcium carbonate associated with much tarry matter. Chloride, traces. Ammonia, traces (probably as chloride). Sulphate, absent. Iron oxide and alumina, traces. Magnesia, practically absent.

The absence of magnesium carbonate from Sample No. 2 may be due to the presence of ammonium chloride in the liquor, which would assist in dissolving the magnesium carbonate.

This report will, I think, be of considerable interest to all who use water containing a percentage of salt; and it may possibly assist our friends of the Waverley Association.

CONCERNING RESIDUALS.

Coke.—The coke market has undoubtedly been very favourable during the past twelve months; and I trust it is not too much to hope that present prices will continue for some time to come. Locally, I am glad to say that for the year 1910 the average price received for coke was better than for several years past; and in comparison with the price paid for coal, a great advance is shown on previous years. We have all pleasant recollections of the paper read by Mr. Carpenter, of Yarmouth, in the year 1909, and the excellent tabular form in which he presented particulars of the coke sales in his town. In discussing this paper, I gave some comparative figures relating to Felixstowe; and I think it will be interesting to repeat them here, with the addition of the figures for the succeeding years.

TABLE No. I.—*Cost of Coal and Price Realized per Ton of Coke.*

Year.	Coal Price. s. d.	Coke (Price Realized). s. d.
1904	16 6	15 1
1905	15 6	13 9
1906	15 8	14 0
1907	17 11	16 4
1908	18 4	17 9
1909	17 11·62	16 11·2
1910	17 5·7	18 0

TABLE No. II.—*Coke Sales.*

Year.	Total of Sales.	Tonnage per Cent. of Total Sale, Delivered on Rail.	Local Sales Unbroken. Tonnage per Cent. of Total Sales.	Local Sales Broken. Tonnage per Cent. Total Sales.	28-lb. Bags per Cent. Total Sales.
	Tons.				
1904	1190	37·58	59·26	3·16	—
1905	1236	46·64	50·36	3·00	—
1906	1162	49·75	47·06	3·19	—
1907	1302	42·12	51·07	6·81	—
1908	1374	22·84	52·80	24·36 (1)	—
1909	1390	26·91	61·44	10·96	0·69
1910	1195 (2)	26·35	57·74	13·61	2·60
1911 (half year)	637	15·53	64·30	17·46	2·51

(1).—In this year, a large quantity of broken coke was sold to the Electric Light Company, for use in a suction-gas plant; and I regret to state that, owing to the use of anthracite and the introduction of a Diesel oil-engine, the demand has partly fallen off.

(2).—Total quantity reduced owing to the manufacture of water gas.

In the year 1909, we commenced to sell broken coke in 28-lb. paper bags; and I feel that the results have justified the adoption of this method. A stock of these bags is kept at the show-rooms. It is a cash trade, and there is practically no cost for delivery, as the majority of the purchasers take the bags with them. The price charged is 4½d. per 28-lb. bag; a slight reduction being made for quantities.

The Commercial Sections in connection with our Association have done, and are still doing, good work. The fortnightly coke returns contain most valuable information with regard to prices in the district; and I feel sure that we must be able to trace some improvement in our returns due to membership of the section. At the meetings, which are quite informal, a great many subjects come up for discussion, views are exchanged, hints given, and regular attendance must prove of inestimable value to the member and the company he serves.

Sulphate of Ammonia.—The present demand for and the market price of sulphate of ammonia are no doubt excellent; and I feel that the work of the Sulphate of Ammonia Committee is doing a great deal of good, and that they are deserving of the support of all manufacturers. I think, however, that the local sale of small quantities of sulphate of ammonia might be considerably extended. We should make it known that the gas company are manufacturers, and advertise the advantages of using it as a manure. It is surprising how much can be disposed of in small parcels to gardeners and others. I have recently been particularly gratified to find the local tennis and golf clubs have been using it with good results, both as a weed-killer and as a manure.

Tar.—We have no doubt to thank the motor-car for the extensive adoption of tar for the treatment of road surfaces. The Felixstowe District Council have been very liberal during the past two years in the matter of tar-painting of roads, for which, I believe, they are commended by every inhabitant of the district; the reduction of the dust nuisance and the improved condition of the road surfaces being undeniable. Gas undertakings as producers must, however, take care not to discourage the use of tar for this purpose by asking extravagant prices, or by supplying an unsuitable article; and if treatment is required to render the tar suitable for use on the roads, they must be prepared to adopt

methods for removing the constituents which the road authorities consider objectionable. I would also plead with surveyors not to be too exacting in their demands. If they require tar supplied to some elaborate specification, the price must necessarily be enhanced; and it may result in the future development of tarred roads being delayed, owing to the question of cost and the burden on the ratepayers. I believe our local Surveyor will admit that the roads in the Felixstowe district which have been painted with crude tar are wearing as well as, and are in as good, or even better, condition than, roads in the near neighbourhood where tar was used which presumably complied with a well-known specification. In fact, the Felixstowe roads bear witness that crude tar from a gas-works is not so black as it has sometimes been painted for use as a material for the treatment of road surfaces.

PUBLIC LIGHTING.

A very important feature has recently been the prominence which has been given to gas for street lighting purposes. It is considerably more than holding its own in competition with electricity; and, notwithstanding the statements made by our competitors, there is no doubt that the older illuminant is proved to be the most suitable method for the lighting of streets. It is most gratifying to read of the recent conversions from electricity to gas in London, the authorities of which are only following the example of the great Continental cities, where the illumination of streets is generally considered of far more importance than in the cities and towns of England. Those authorities who are not influenced by the desire to increase the output of their own electricity works at the expense of the ratepayers, rarely become converts to the doubtful advantages of electric light. Where fair competition exists, gas almost always reigns supreme; and it is "up to" those who supply gas to give such satisfaction that there shall be no possible cause for complaint on the part of the local authorities.

Though the Felixstowe Council and local electric undertaking work in conjunction, under a scheme which I propose to describe, when speaking on the question of competition, the Gas Company have, fortunately, so far been able to retain the bulk of the street lighting. The promenade is lighted by electric arc lamps, and a few streets by tantalum and osram lamps. The price charged for the latter are ridiculously low; and I venture to say that the Company would not accept the same terms for the lighting of the whole town. The ordinary price of electric current in Felixstowe is 8d. per unit in the summer months and 6½d. in the winter. The current for lighting the promenade is charged at 3½d. per unit; but it is difficult to say what is allowed for the above-mentioned incandescent electric lamps.

I am greatly in favour of the inverted gas-burner for street lamps; and we have been particularly successful with suspension lamps of this type, containing from one to five burners, even in such an exposed position as the cliff on the sea front. In streets where trees are planted which would hide the light from an ordinary standard lamp, these inverted lamps, suspended over the road at a height of about 16 feet by means of a bracket attached to the ordinary column, are greatly favoured by the Council; and my only regret is that the best results are obtained from a lamp of foreign make, the bye-passes of which give practically no trouble even in stormy weather. In some cases, we do without the bye-pass—the lamps having an outside lighting arrangement in which a torch is inserted. In all ordinary street lamps, the bye-pass is entirely absent; the lamplighter using a torch with most satisfactory results.

DISTRIBUTION TOPICS.

The sales department of a gas undertaking occupies year by year a more important position, particularly in towns where there is competition with electricity; and a well-situated and a well-stocked show-room is practically a necessity. The staff in charge must be well versed in all the details concerning the consumption of gas, be courteous in manner, and able to advise and instruct consumers in the proper use of all up-to-date gas apparatus. Such a show-room should not, in my opinion, be run with the view of obtaining an adequate return from the goods sold. This should be entirely a secondary consideration, as gas undertakings have a future interest in the sale of any article which consumes gas.

The staff of fitters employed should be of the best class—they should understand, and be able to explain, the working of any gas apparatus they are called upon to fix. The foreman fitter should be thoroughly conversant with everything relating to the distribution of gas, be able to advise consumers, interview, and give estimates, also to do any necessary canvassing for orders; and one of his principal objects should be to ensure that the best possible relations shall exist between the consumers and the Company.

I have tried to fulfil all these ideals at Felixstowe; and I believe practically the whole of the gas-fitting work required in the town is done from the Company's workshop by the fitters in the Company's employ; and very few gas-fittings are supplied and fixed which do not come from our show-rooms. We are thus in close and intimate touch with all our consumers—resulting, I hope, in general satisfaction and a minimum number of complaints. The question of the proper education of gas-fitters is claiming a great deal of attention at the present moment; and though I have every sympathy with the proposals made, I feel strongly that the best school for a gas-fitter is the gas company's workshop, and the apprenticeship system should create a supply of the competent men for which there is so great demand.

COMPETITION.

The competition with electricity in Felixstowe is very severe, more particularly because the Council and Electricity Company have a working arrangement. But I think every one will give the Gas Company credit that they more than hold their own under most difficult circumstances. In the year 1903, the Felixstowe Council entered into an agreement for a period of 25 years with the Suffolk Electricity Supply Company, under the terms of which the sum of £8000 was paid down; and it was provided that all money for future capital extensions should be found by the Council—the Company paying interest upon the whole of the capital outlay at the rate of 6 per cent. per annum. At the end of 25 years, the Council can take over the works without further payment. It was also provided that the Council might determine the contract at the end of 15 years, and take over all works, on paying the Company a sum equal to 2½ per cent. per annum on the then capital outlay, for loss of profit during the then unexpired term of the agreement. The Company are entitled to all revenue during the period of the agreement; but it is collected by the Council. The Company's cables (which are overhead) and the meters were not included in the agreement.

A similar arrangement was condemned by Sir William Preece when consulted by the Council a few years previous to this agreement; and in his report he said: "I cannot recommend the Felixstowe Council to make such a foolish bargain." The Council, however, in 1903, consulted another expert, who recommended this arrangement; and though it was strongly opposed by the ratepayers at the Local Government Board inquiry, resulting in the Council being advised to re-consider the matter, they went forward with the original scheme.

Felixstowe is growing very fast, and the building trade has been fairly busy for some years; consequently, it is always necessary to be on the look out to see that all new houses are piped for gas. This work is generally done for the builders by the Company; and it is a very rare case indeed in which it is not possible to obtain the order to carcase a house, though the price per point is often a negligible one, owing to the keenness of the electricity people to get the house wired. Though a large amount of the work is done free of charge, and only a nominal sum per point charged for the remainder, builders have told me that the houses would have been wired for electric light at a lower figure.

In Felixstowe, we are just undergoing an experience in a district recently invaded by electricity, which throws a great deal of light upon the methods our competitors have to adopt to persuade gas consumers to enter their fold. I have received reliable information that shops and public houses are being wired and fitted free of charge, and in more than one case connected, "for the present," without a meter. The meter must, of course, follow at an early date; and then I have great hopes of the effect of the quarter's account for electric current at the Felixstowe price of 6½d. and 8d. per unit.

Early in the present year, I commenced a general canvass of the houses in the district, with the view of obtaining an idea of the position which gas occupies in the favour of the Felixstowe public in comparison with electricity, to discover weak spots which might be remedied, and to find possible openings for the introduction of new business. Though not yet complete, I think you will be interested to know that, out of a total of 1143 houses canvassed, at 1135 gas was in use for some purpose, at 818 it was employed exclusively for lighting and electricity at only 148, while at 114 both were in use. The balance can be accounted for by houses where gas is used for cooking and oil-lamps for lighting. The number of houses in the district is 1860; and the total number of consumers on the Company's books at Dec. 31, 1910, was 1361.

Outside gas-lamps for shop lighting are in great favour with the Felixstowe tradesmen; and I believe it to be a business well worth cultivating. All possible attention should be paid to this class of consumer, and he should have every inducement offered him to use suitable lamps, and to contract under the Company's maintenance system. I think the popularity of the gas-lamp often excites the envy of our competitors, for they adopt all sorts of methods to create a demand for electric lamps—*e.g.*, about the month of June, 1910, a certain firm opened a new shop in Felixstowe, outside which were fixed two three-light Graetzin gas-lamps. At this time of the year, there is not much need for lighting, and as far as I know these lamps were used but very little until just recently. Shortly after the shop had been opened, I noticed that a 600-candle power metal filament electric lamp had been fixed between the two gas-lamps; and not very long after, in an issue of an electric magazine called "The Unit," there appeared a photograph of this shop front, with the following inscription under it: "On this Felixstowe shop-front, one 600-candle power metal filament electric lamp has displaced two so-called 500-candle power new type gas-lamps. The electric light has proved better as well as more convenient."

I do not wish to be too hard on our local Electrical Engineer; but I have heard of, and sometimes seen, letters originating from his office to the following effect. "Dear Sirs,—We note your new shop at Felixstowe will shortly be opened. With a view to advertising yourselves and our electric light, we should be pleased to lend you a 600-candle power osram lamp, &c., &c." The lamp in question may have been one of this class; and I should not be surprised if the words "free current" were included in the letter. In any case, the electric lamp has recently been removed; and the tradesman has returned to the use of the two gas-lamps, which, we are informed, he considers to be the best and cheapest means

of lighting the outside of his premises. I doubt whether we shall see the electric lamp again, unless, of course, it is supplied on the terms outlined above, against which kind of competition it is impossible—and the Gas Company have certainly no wish or need to—to compete.

MAINTENANCE.

Maintenance is one, if not the most, important department of a gas company's fitting business. In my opinion, terms should be made elastic to suit different classes of consumer; for, personally I believe that a fixed charge per burner is a mistake. Maintenance work can often be obtained at special rates, which would be lost, and probably also the consumer, if the company refused to make any exception to their fixed scale of charges. The gas consumption and the giving of satisfaction to a consumer must stand before rules and regulations or the question of profit or loss upon services rendered to ensure a good light.

Perfect satisfaction throughout the distributing system can, however, only be secured by supplying gas at adequate and even pressures. This is a vital point; and I am afraid it is only too true that in a large number of small towns it is still considered necessary to maintain a low pressure at the works in order to keep down the quantity of unaccounted-for gas in the district. It is impossible to educate consumers up to the advantages of incandescent lighting, particularly inverted lighting, or in the use of gas-fires and even cookers unless a proper supply is given for these purposes. I am one of those who firmly believe that the minimum pressure throughout the district at the time of maximum consumption should not be less than 3 inches—and I have proved to my own satisfaction that the best results are obtained at this pressure—also that excessive leakage and complaints from consumers of swollen accounts need not necessarily follow from such a practice.

The constant improvements which are being made by manufacturers in the construction of inverted burners, fires, and water heaters continually enable gas companies to open up fresh fields for the consumption of gas, the increasing efficiencies which it is possible to obtain from the gas apparatus placed on the market seem never ending, and research work and invention are on our side to ensure the future prospects of gas.

GAS HEATING.

Referring more particularly to gas-fires, I feel we have not yet quite reached the desired point in construction which will make them appeal to the general public as a necessity in every household. Every consumer recognizes the convenience of the gas-fire, and many admit its efficiency as a heating medium; but there are numerous cases where it is impossible to persuade consumers that these good qualities compensate for its appearance as a fire. The day is, however, I think, not far distant when gaseous fuel will occupy a very important place in the households of the country, and gas-fires will be more generally used for heating rooms.

With regard to water heaters, recent improvements in the construction of apparatus have no doubt brought gas more into favour for this purpose; and I believe it will not be long before we shall be able to overcome the prejudice in favour of the kitchen coal-range, with the consequence that cooking by gas will also be largely extended.

PUBLICITY.

Advertising is a most necessary charge on the expenditure side of a gas companies' revenue account, though it should be kept within proper limits. Judicious advertising does a great deal of good; but indiscriminate advertising, or continual dinning into the ears of the public that gas is cheaper than electric light, is, in my opinion, waste of money. We should educate the public up to the uses to which gas can be put, and its advantages as a source of light, heat, and power; correct, when advisable, all extravagant misstatements made by our competitors; but not abuse the article they supply. Let all the abuse come from the other side; and from recent literature issued in Felixstowe, they seem well able to supply all that is required. I hope the Publicity Committee, from whom we all expect so much, will adopt as their principle the advertising of gas, not the abuse of electricity.

I possess a collection of advertising matter issued by the Felixstowe electricity undertaking, some of which does not by any means do them credit, and, I feel convinced, does not do them any good with the public. I can only hope that the matter is not produced locally, but that it is supplied from the head-quarters of the Electricity Publicity Committee, who have yet to learn that it does not pay in advertising to throw mud at competitors.

I trust my friend the Electric Lighting Engineer will not take exception to my disclosures and remarks respecting the methods adopted by his Company, but will take it all in good part, recognizing that this is a privileged occasion, and that I am speaking to a body of professional men.

THE FELIXSTOWE GASLIGHT COMPANY.

Before bringing my address to a close, I propose to allude very briefly to the history of the Felixstowe gas undertaking. The Company is not one of those long-established concerns having an interesting record going back to the early days of gas lighting; it being so recently formed as the year 1883. The first Act of Parliament was obtained in 1904. Gas was first supplied to the public on Dec. 5, 1884, and the output for the first full year (1885) was only 750,000 cubic feet. Ten years later (1895), this had increased to 6¾ millions; ten years later still (1905), to nearly 30 millions; and for the last complete year (1910), it exceeded 39 millions. The rate of increase has so far been well maintained during 1911; and the total output for the year will probably reach from 42 to 43 million cubic feet.

When speaking of output, my thoughts naturally turn to the percentage due to day consumption; and I trust I shall be excused for bringing the following table to your notice.

TABLE *Showing Day Consumption per Cent. of Total Monthly Output.*

[Day ratios to Total output.]

	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
January . .	45·82	48 13	48·89	51·31	53·23	53·1	51·1	51·5
February .	41·17	43·28	44·81	49·28	50·04	49·9	49·1	50·0
March . .	39·09	39·87	40·23	44·40	48·32	44·8	46·0	47·7
April . . .	41·18	41·29	43·15	47·51	50·61	48·6	49·0	47·5
May . . .	46·19	46·13	47·88	54·36	55·02	57·5	51·7	53·3
June . . .	50·29	50·88	52·69	56 93	58·28	58·7	58·6	59·0
July . . .	49·61	54·73	56·54	56·63	58·74	59·0	58·6	57·6
August . .	46·40	49·29	51·59	57·56	50·72	54·5	55·3	52·1
September .	40·39	42·62	48·10	49·12	48·94	50·8	49 8	—
October . .	40·06	42·82	46 80	50·63	49·03	48·9	47·8	—
November .	43·07	45·69	49·67	49·45	52·58	49·9	49·7	—
December .	47·39	49·57	52·32	52·36	50·81	50·6	51·3	—

TABLE *Showing Yearly Output of Gas, with Proportion due to Day Consumption.*

—	1904.	1905.	1906	1907.	1908.	1909.	1910.
Yearly total gas output.	25·688	29·837	29·722	33·250	36·271	35·364	39·005
Day ratios to same .	44·22	46·19	48·56	51·62	52·20	52·19	51·5

The total number of consumers on the Company's books at Dec. 31, 1910, was, as previously stated, 1361; and of these, 688 are on the prepayment system. The number of cookers and fires on hire at this date were 569 and 119 respectively. The rate for lighting and cooking is the same; but for heating and gas-engines, a special discount of 5d. per 1000 cubic feet is allowed from the lighting price. In the case of gas-fires a discount meter is used to determine the consumption.

The continued and rapid growth of the Company has, you will readily recognize, necessitated considerable and constant expenditure; and those of you who take the opportunity of paying a visit to the works, will, I trust, in making comparisons, be lenient, and bear in mind that there has been very little opportunity to attend to all those little niceties which are so pleasing to the eye of the visitor to the majority of gas-works in our district.

The Company have naturally to depend largely on the summer consumption—the September quarter accounting for over 30 per cent. of the total output—and owing to the large increase in population during the season, the plant at the works has to be of sufficient size to cope with demands not experienced in inland towns of similar size. This means that during the slack months of the year the plant is not always so profitably employed as might be the case were the population entirely a resident one. These, and other peculiarities common to seaside towns, where no particular industry is in existence, prevent gas being supplied at so low a price as might otherwise be possible; and such local conditions should be taken into consideration when making comparisons.

Felixstowe, being a comparatively new and growing town, the Company have been considerably handicapped; but I believe the day is rapidly approaching when the large tracts of open spaces will be built upon. Then the Company may expect a reduction in interest charges and leakage, and obtain a more satisfactory consumption of gas per mile of main, resulting in benefit to both consumers and proprietors.

The show-rooms and offices (which I hope you will also find time to visit) were built in 1905. A good selection of gas-fittings, &c., are always kept in stock, and I believe you will agree that the Company are quite up-to-date in this matter, also that the show-room is a bright and attractive one. The fitting business has already outgrown the capacity of the workshop and stores; and my Directors recently decided to make considerable extensions in order to provide accommodation for the fitters, stores, and the cleaning and repair of cookers and fires.

I must now thank you for your patient attention to this address. I feel it does not present any particularly novel features, and I hope you are not very weary.

At the close of the address,

Mr. JOHN BARTON (Peterborough) proposed, with much pleasure, a hearty vote of thanks to the President for his able and instructive address.

Mr. W. B. FARQUHAR (Ilford) seconded the motion, which was cordially agreed to.

The PRESIDENT acknowledged the thanks of the members.

PAPER AND DISCUSSION.

Mr. W. B. FARQUHAR (Ilford) read a paper on "High-Pressure Lighting;" and this, with a report of the discussion, is published in this issue (pp. 37-42).

Town and Place of Next Meeting.

The President moved that the spring meeting be held at Peterborough. They had not received any invitation from their friend Mr. Barton or his Directors. He (the President) thought, and the Committee agreed, that they ought not to expect entertainment from gas undertakings in their district twice in one year. It was also considered that the spring meeting should be held in a central town in the district, so as to be convenient for a majority of the members.

Mr. H. Duesbury (Hertford) seconded the motion; and it was at once agreed to.

This concluded the business.

Visit to the Electricity Works.

On the invitation of the Electrical Engineer (Mr. Napier Prentice), a number of the visitors later on inspected the electricity station, which was found well equipped with plant. Mr. Prentice is evidently a great believer in the internal combustion engine for electricity generation. The last extension of the plant consists of a large Diesel oil-engine, the working of which the members much admired. For the lighter loads, there are also engines driven by producer gas and town gas.

Dinner and a Presentation to the Retiring Secretary.

In the evening, the members, lady friends, and other visitors dined together at the Felix Hotel. The President was in the chair; and the guests included the Chairman and Directors of the Gas Company, and a number of local gentlemen.

The Loyal Toast having been honoured,

Mr. Worthington Church proposed "Success to the Eastern Counties Gas Managers' Association," and referred to the great help rendered by such a body to the managers of the smaller gas undertakings.

The President, in reply, said the meetings of the Association had been of incalculable benefit to himself and other members, who exchanged views and gathered much valuable information regarding the gas industry. He expressed the hope that there would be a larger support of the Benevolent Fund of the Institution.

Mr. John Young, in submitting the toast of "The Felixstowe Gaslight Company," said its history was a marvellous one. From three-quarters of a million cubic feet in the first year of the Company's existence, they would this year touch probably 45 millions. This progressiveness was due to the wise generosity of the Directors, and also to the up-to-date character of the works.

Mr. S. Alexander (the Chairman of the Company) and Mr. T. E. Priestman acknowledged the toast.

Mr. W. B. Farquhar proposed "The Town of Felixstowe;" and Mr. E. H. Woodmancy and Mr. A. J. Haward responded.

Mr. T. A. Guyatt followed with the toast of "Kindred Associations," coupling with it the name of Mr. R. G. Shadbolt, the President of the Institution of Gas Engineers.

Mr. Shadbolt, in reply, said the gas industry had to adapt itself to the requirements of the age. He asked, however, if it was not passing strange that, after a century of service, it was the least advertised and the least known of any industry. With the advent of electricity they must change their methods; for the only justification they had for existence was the public service.

Mr. F. Prentice submitted the toast of "The President" in felicitous terms—eulogizing Mr. Paternoster for his conduct of up-to-date works.

The President having responded,

Mr. J. W. Auchterlonie proposed "The Retiring Hon. Secretary and Treasurer and his Successor." In doing so, he spoke as follows: Mr. President, ladies, and gentlemen,—The toast of "The Secretary of our Association" is always received by our members with cordiality and enthusiasm, for we recognize that it is but a humble and inadequate tribute of our appreciation of the gratuitous services rendered to us as a body by the Honorary Secretary. It is true that your Committee, more especially the President, do a considerable amount of work during the year; but it is only for a short period, and then some other gentleman relieves them. The Secretary, on the other hand, is responsible for the continuity of the work, and in a large measure for the success of our Association. This year we have a state of affairs that has only occurred twice previously in the history of our Association. I refer to the fact that to-day we have changed our Secretaries. In 1888, an Association was formed with Mr. Wimhurst as the Secretary. It started with a very small membership; and he left it in 1895 with a membership of nearly 70. Mr. Troughton then took over the duties, and he held office for a period of seven years—leaving the Association with a membership of 85. In 1902, Mr. Guyatt kindly undertook the duties; and to-day our membership numbers 115. We have been very fortunate indeed in securing Mr. Davis, of Gravesend, to act as our Secretary; and we trust that he will beat all predecessors, not only in the membership of our Association, but in his length of service. He is a gentleman of large experience in the secretarial work of a Gas Association, for he was for many years Secretary to the Gas Institute. We thank him for taking up these duties, and we look forward with much confidence to his years of office. While we thank Mr. Davis for services to come, we are more particularly concerned to-night in recognizing those of Mr. Guyatt for the past nine years. It has been felt for some considerable time, by many of our members, that Mr. Guyatt ought to be elected to the highest honour we have to bestow—that is, to the presidency of our Association; and, as a first step towards this post, he was unanimously elected Vice-President at our last meeting. Your Committee, while cordially supporting Mr. Guyatt's election to the Vice-Presidentship, felt that, after such long and faithful service, some recognition ought to be made in a tangible manner of Mr. Guyatt's work; and as a result, I was requested by the Committee to get up a testimonial to the retiring Secretary. An appeal was made, and this met with ready and hearty response. It is very gratifying indeed to have so many letters from the members cordially supporting the testimonial, and giving expression to their appreciation of Mr. Guyatt's courtesy and gentlemanly treatment of all members of our Association. Perhaps I may be permitted to read an extract from one letter which sums up the spirit of the members:

> I hope I am not last in responding to your kind appeal *re* our mutual friend Mr. T. A. Guyatt's ungrudging services rendered to the Eastern Counties Gas Managers' Association over a long period of years, and that some recognition should be made in tangible form as a mark of appreciation and esteem by the members. Please accept of my small gift to the fund. . . . I hope that the Committee will bring it to a successful issue. I may state that Mr. Guyatt's father and I have been close friends since 1856; and I am glad of the honour to recognize the gratuitous services of the son, always so gentlemanly and cheerfully given.

Mr. Guyatt, with his usual modesty, when I approached him requesting an indication as to the form he would like the testimonial to take, deprecated our action; and as it appeared that there was only one article that Mrs. Guyatt and he would like—viz., a musical instrument—and as your Committee did not feel sufficiently expert to select such an instrument, they decided to present a cheque and an address with a list of subscribers in album form. This address and cheque I have now very much pleasure in presenting to Mr. and Mrs. Guyatt. During the past year, I have had many opportunities of meeting Mr. Guyatt on the Association's business, and I have formed a very high idea of the manner in which he has worked in the interests of our Association. I am proud to have him as a neighbour, for he is esteemed and respected not only by us but by his fellow-citizens in Ely. In your name, gentlemen, I wish Mr. and Mrs. Guyatt long years of health and happiness.

The album bore the following inscription:—

> EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.
>
> *Sept.* 29, 1911.
>
> This Album, containing a List of Subscribers, together with a Cheque, was presented to T. A. Guyatt, Esq., A.M.I.C.E., by the Members of the Eastern Counties Gas Managers' Association, on his resigning the office of Hon. Secretary to accept the position of Vice-President, as a small token of appreciation of the valuable services and unfailing courtesy rendered and experienced by him during his tenure of the Secretaryship for the past nine years.
>
> [Then follows list of subscribers.]

Mr. Guyatt and Mr. Davis both responded to the toast that Mr. Auchterlonie had submitted.

In the course of the proceedings, songs and sketches were given.

Exhaust Gases from Gas-Engines.—The effect of the exhaust gases on guinea pigs and mice has been observed by Professor Dr. S. Delépine, with an engine working under varying conditions of load and of air and gas supply. With the engine fully loaded, the exhaust was free from poisonous gases, but was dangerous to human beings owing to the large proportion of carbon dioxide and the absence of oxygen. When the air supply was insufficient for complete combustion, the exhaust contained up to 4½ per cent. of carbon monoxide, and was dangerous for inhalation when diluted with less than fifty volumes of air. Insufficiency of air supply may arise from trivial causes, such as partial blocking of the air-pipe. It is recommended to public authorities that the discharge of exhaust gases into sewers should be forbidden, and the discharge into any confined space to which persons have access should be avoided.

Lectures on the Calorimetry of Fuels.—As announced in the "Journal" last week, a special course of six lectures on "The Calorimetry of Fuels" will be given at the City and Guilds Technical College, Leonard Street, City Road, E.C., by Mr. J. H. Coste, F.I.C., and Mr. E. R. Andrews, F.I.C., on Wednesday evenings from eight to nine, commencing to-morrow. The first lecture will be of an introductory character; and in the others the lecturers will deal with the calorimeter and its surroundings, the calorimetry of gaseous fuel, still and flowing water calorimeters, and the caliorimetry of liquid and solid fuel. In the last two lectures, oxidizing mixture and low-pressure oxygen calorimeters and the bomb calorimeter will be described. The fee for the course is 6s. In connection with these lectures, a series of demonstrations on fuel calorimetry will be given by Mr. B. R. James, F.I.C., in the engineering laboratory of the College on Tuesday evenings from six to eight o'clock, commencing on the 10th inst.

Davis's

The "APOLLO"
(In 3 Sizes).

The "ROYAL."

The "VESTA"
(In 3 Sizes).

New Barless Gas Fires

Chapter 4.

INTERCHANGEABILITY

has already been indicated as the main argument—strong, convincing, undeniable—which appeals to Gas Undertakings in connection with these Fires.

We wish to emphasize the point again, at the same time stating that this vital principle of Interchangeability is, FOR THE FIRST TIME IN GAS-FIRE CONSTRUCTION, EXTENDED TO THE BRASS WORK. There is one standard set of fittings for every one of the 95 varieties in the New Barless Series. We score all round for

MAINTENANCE.

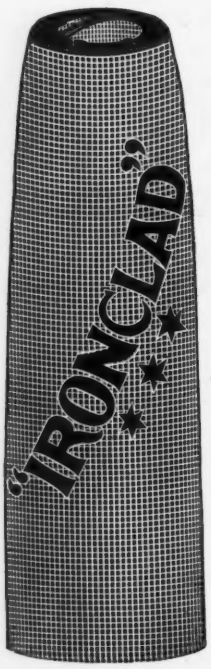
The Davis Gas Stove Company, Ltd.
LUTON.

SHOWROOMS

LONDON - - - 59, Queen Victoria Street, E.C.
MANCHESTER - 4, Victoria Arcade, Deansgate.
PARIS - - - - - - 82, Rue d'Hauteville.

LOOM WOVEN GAS MANTLES.

"IRONCLAD." "EVENING STAR."



The STRONGEST MANTLES on the MARKET.

Absolutely the Best and Cheapest for Street Lighting AND Maintenance Work.

The "IRONCLAD" Loom Woven Mantle is fitted with the Patent Metal Top, which strengthens Head of Mantle.

The "EVENING STAR" Loom Woven Mantle is designed and woven in unique manner to secure the greatest strength, coupled with utmost luminosity. Notice tight weaving at both head and skirt of Mantle.

SAMPLES FREE FOR TESTING PURPOSES.

Also Loom Woven "Ironclad" and "Evening Star" INVERTED Mantles.

ENTIRELY BRITISH MADE.

CURTIS'S & HARVEY, LIMITED,

3, GRACECHURCH STREET, LONDON, E.C. MANTLE FACTORY—DARTFORD, KENT.

HIGH-PRESSURE LIGHTING.

By W. B. Farquhar, of Ilford.

[A Paper read before the Eastern Counties Gas Managers' Association.]

When asked to supply a paper for the September meeting of the Eastern Counties Gas Managers' Association, it was with extreme difficulty that I could fix on a subject on which to base a few remarks of general interest to the members, and one which would draw forth a good discussion. Papers on high-pressure gas lighting have already been read at various meetings; but as far as my memory goes, this subject has not been fully discussed by the Eastern Counties Association. This fact has led me to choose this particular subject for my paper to-day. I purpose, therefore, giving a few particulars of the high-pressure gas installation at Ilford, and what has been accomplished by it.

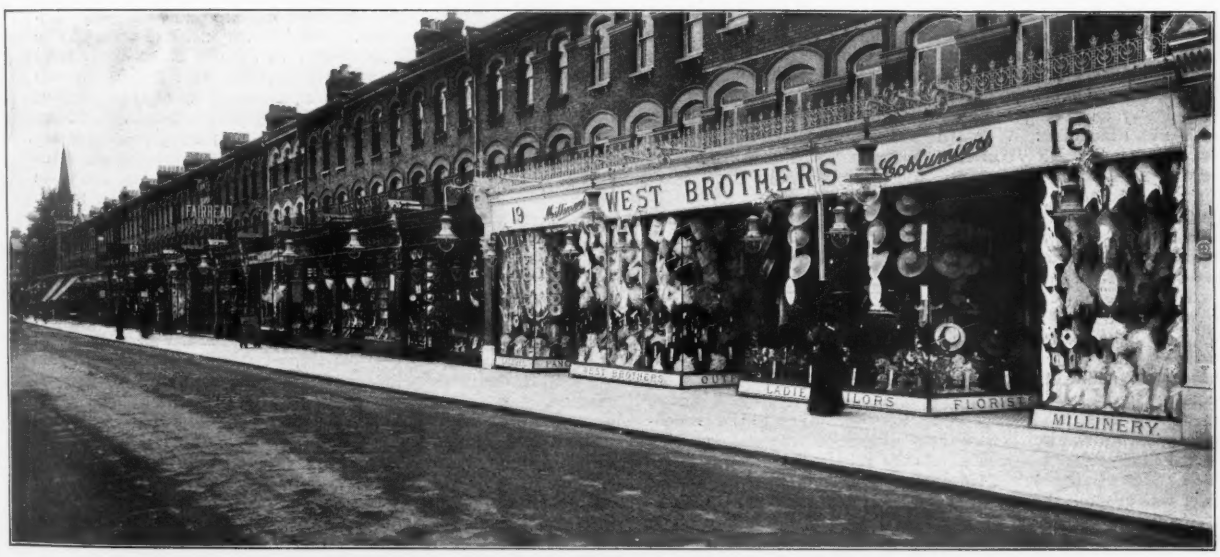
With regard to some of the papers read before other Gas Associations on high-pressure gas lighting, they have more or less emanated from engineers and managers who are in charge of large works, and who have likewise large areas of supply under their jurisdiction. The plant described by them has therefore been on a very large scale, and they have been able to describe their high-pressure installations in very flowing and, if I may use the phrase, very big language. I have no doubt that this has in many instances made managers of small or medium sized works who have heard or read these papers feel that high-pressure gas is only suitable for, and can only be utilized with advantage by, gas companies having big areas of supply. This, however, is an entirely wrong impression, as high-pressure gas lighting is suitable and can be adopted to suit the requirements of quite modest sized works. Small compressors are made, driven by gas-engines, suitable for running any number of lamps from three 1000-candle power lamps and upwards. The manager of a small gas-works is, therefore, in a position to adopt high-pressure lighting in his district just as easily as his brothers in the gas profession who control larger concerns.

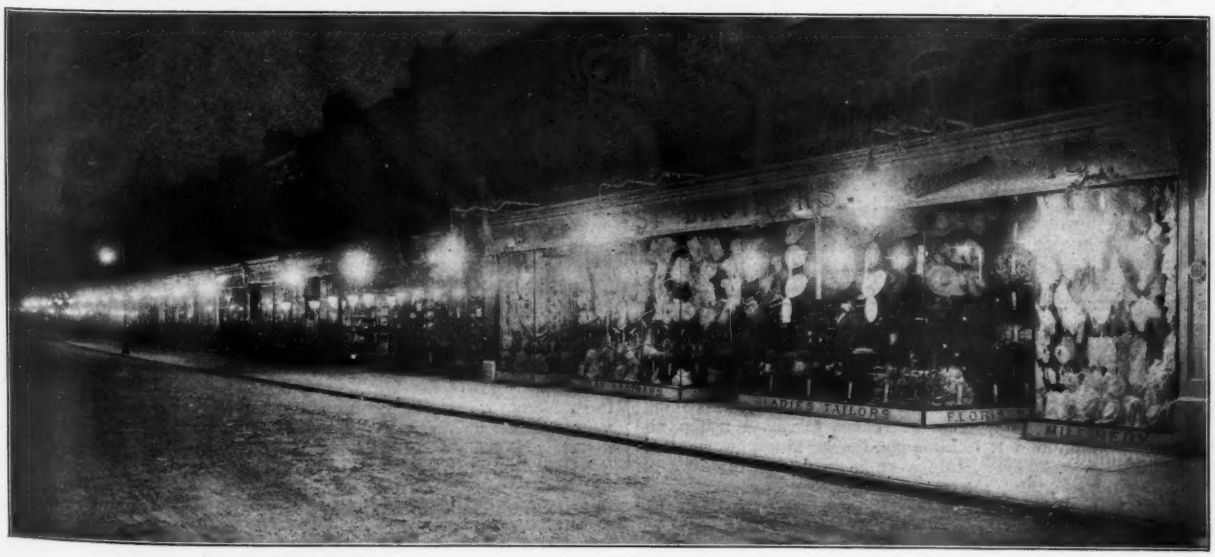
The Company whom I now have the pleasure to represent—the Ilford Gas Company—have always been to the forefront in high-pressure lighting; and I understand it has been generally recognized as the first Company to instal high-pressure gas lighting on what is now termed "Parade or Scale Lighting." Parade lighting has made remarkable advances during recent years, and is one which has enabled gas companies to compete with electricity in a very marked and striking manner for outside shop lighting. The first installation of parade lighting in Ilford was carried out in the year 1901, in the Cranbrook Road, where a row of about 45 shops was supplied with overhanging lamps, suspended well over the pavement. As the shops were all of a uniform size, it enabled the lamps to be fixed at a regular height and at equal distance from each other—the effect being very striking.*

At the time this installation was put in, 8 inches was considered to be a very high-pressure for gas delivery; and this was the pressure used for the lamps on this parade. The installation consisted of a Keith and Blackman's water-driven compressor, which was afterwards replaced by a small rotary compressor driven by a gas-engine. The number of lamps installed was 45; the total number of burners being 121. These lamps were fitted with upright burners, and consumed 10 cubic feet of gas per burner per hour; the candle power per burner being about 300. Some of the lamps were fitted with three burners and some with two. The total gas consumption for the 121 burners per annum was 992,400 cubic feet, or 8200 cubic feet per burner, while the cost of maintenance and repairs, together with labour, was £72 3s., representing a cost of practically 12s. per burner per annum.

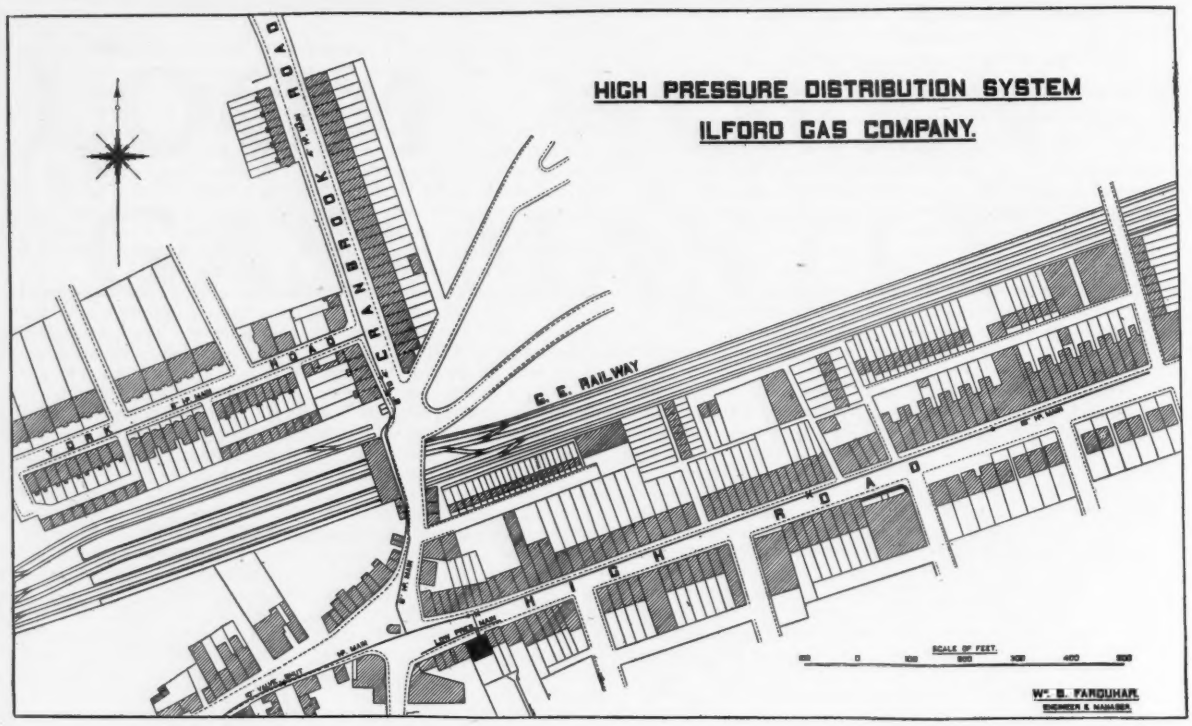
This installation proved itself very efficient and effective during the many years of its existence; but there came a time when it was felt that something would have to be done to make it more up-to-date if we wished to retain this parade for high-pressure gas lighting. The lamps were getting very dilapidated looking; and as the local District Council were making strong overtures to

* A photograph of Cranbrook Road, showing the lighting effect, was reproduced in the "Journal" for Feb. 10, 1903, p. 346.





THE HIGH-PRESSURE "PARADE LIGHTING" IN CRANBROOK ROAD, ILFORD.



capture some of our consumers, there was a feeling that electricity would appeal to some of these shopkeepers and thus spoil the continuity of the lighting of this parade. After giving the matter careful consideration and looking fully into all the details and particulars, I recommended my Board to go in for a system of high-pressure lighting on modern lines at 54-inch pressure; the particular system being the well-known one invented by Messrs. Keith and Blackman. When the matter was placed before the Board, they immediately consented to the installation—recognizing that the scheme was the only one by which we could hope to retain our consumers; and subsequent results and events have fully justified the step. When the old high-pressure system was first installed, the price paid by the shopkeepers included a sum to cover the hire-purchase of the lamps, so that in course of time they became their own property. As the consumers in Cranbrook Road had therefore already bought the lamps, it was thought we could not again ask them to purchase new lamps; otherwise it would probably mean losing some of them. My Board therefore decided to instal gas-compressors, supply and fix lamps free of charge, and maintain, clean, light, and extinguish the lamps at an inclusive charge per lamp. The scheme was first worked out on paper; and when ready we were in a position to go to the respective consumers and put before them a definite proposal, and give them definite figures of costs. As the price per lamp was just a shade under what they had originally been paying and the candle power was greater, the whole of the shopkeepers, with one exception (which I will refer to later), accepted our scheme. The installation was therefore put in hand; the work being finished and ready for lighting in the autumn of 1908. [See photos.]

If you will now look at the plan, you will there see the whole extent of our high-pressure area. The compressing plant is situated in the basement of the Company's show-room which is clearly indicated on the sketch (in black), the leading main from the compressors crossing the roadway being 6 inches in diameter. This 6-inch main is connected into a 10-inch main running east and west along the High Road. From this main a 6-inch branch, reducing to 4-inch, is taken along to Cranbrook Road, while a 6-inch branch leads from the 4-inch in Cranbrook Road, and is carried a short way down York Road. I have no doubt that some members present will be surprised at the size of the main laid down in the High Road—viz., 10 inch. This main, however, was originally an ordinary gas-main which had been thrown out of use when the Company installed a larger main in this road; and we therefore took advantage of this and utilized it for high pressure. Had it been necessary to lay a new main, it would probably have been a 6 inch. As this 10-inch main had been lying "dead" for a considerable time, I had a doubt in my own mind as to whether it would be suitable for high-pressure gas at 54-inch pressure; and before finally turning on the high pressure to our lamps, this main was tested at the pressure which it had to stand. We have had no reason to regret using this main, as we have found it to be in good order and quite suitable for the purpose. The lead joints were in good condition, and as far as we can trace, there are no signs of any serious leakage.

Having such a large area of main, the time taken by the compressor to raise the pressure from normal to the 54 inches required is about six to seven minutes, and likewise a corresponding time elapses before the pressure drops to zero when the compressors are shut down after lighting hours. The lamps, therefore, do not immediately feel the effect of the compressor being shut off, as it is only after a lapse of at least four to five minutes that any diminution of the light is noticed. This is a very useful position to be in, as it gives the attendant plenty of time to start the reserve compressor in the event of anything going wrong with the one working, and he is able to get everything going as usual without the outside public knowing that anything has happened. We have fortunately had no trouble of this description; but you will readily see that this five minutes to work on is of great advantage. Another good feature of this large main is that there is not the same chance of fluctuation being carried from the compressor to the lamps themselves.

The compressing plant consists of two Keith and Blackman "C" type gas-compressors, driven by gas-engines, coupled direct and fixed on the same bed as the compressor. Each compressor is capable of compressing and supplying gas to a hundred 1000-candle power lamps. At the time the compressors were installed, the total number of lamps we had to provide for was about fifty; and as each compressor is capable of dealing with double this number, it was thought that we had left ample margin to carry us over many years. The success of our high-pressure lighting, however, has been so great, and the demand for high-pressure lamps having come in so quickly, we very soon reached the limit of our compressors; and as there is every possibility of this increase continuing, I have decided to recommend my Board to put down compressors of double the capacity. We have at present the following lamps in use:

18	600-candle power		
74	1000	,,	,,
8	1500	,,	,,
4	600	,,	,, on 10-inch pressure.

With reference to the four lamps on 10-inch pressure, you will recollect that I mentioned earlier in my paper that all the shopkeepers were willing to take on the new high-pressure scheme with the exception of one. This shopkeeper would not hear of the new lamps, but preferred to keep the four 600-candle power lamps which he already had in use. To meet him in this, we arranged to retain the lamps, and placed a governor on the service from the high-pressure main, reducing the gas-pressure from 54 inches down to 10 inches. This arrangement has answered admirably; and we have had no trouble either with the lamps or with the governor.

We had experienced in the early trials with one or two of the lamps that the maintenance costs gave an indication of being extremely heavy. In the first instance, the lamps were fitted with an inner globe. But this inner globe has been discarded. We have also adopted the system of using a body of a higher power lamp fitted with a lower-power nozzle. In other words, we use 1000-candle power nozzles in lamp bodies which are supplied by the makers for their 1500-candle power lamps. This has had a very marked effect on the life of the globe, because, whereas formerly when a mantle happened to break or split, the flame used to shoot out and impinge on the globe and soon shatter it, now the globe being further from the flame there is not the same likelihood of this happening. We have also succeeded in getting globes which stand the heat and weather remarkably well. The mantles also have improved considerably in quality during the past year or two; and we now have a mantle which gives a very good result as regards length of life and light-giving properties.

By this means, we have brought our maintenance charges down to quite a reasonable figure for the renewal of globes and mantles. The improvements made in these mantles give every indication that we have not yet reached finality in this line.

When the new installation was first started, we were rather at a loss to know what charge to make for the lamps per annum, having no figure to work on—the maintenance, cost, life of mantles, globes, and lamps being at that time unknown. It was, however, resolved to start on somewhat similar prices to those charged for the old system, and the price was fixed at £4 8s. per annum for 1000-candle power lamps, and £3 per annum for the 600-candle power, less a discount of 5 per cent. if paid within two months from quarter day. We found, however, that this price could with advantage be adjusted, and the charge for the 1000-candle power lamps was brought down to £4, while the 600-candle power lamps remained at the same figure as before—viz., £3 per annum.

Subsequent working has enabled us to find out what the lamps are actually costing as regards maintenance, globes, and mantles; and the figure I have just given you is one which enables us to do the lighting and get a small return.

The shopkeepers are required to sign an agreement form, to be retained by the Company—a duplicate being signed by myself, on behalf of the Company, and handed to the shopkeeper. The following is a copy of the agreement form.

MEMORANDUM OF AGREEMENT made this day of 19 , between the Ilford Gas Company (hereinafter called the "Company") of the one part and of (hereinafter called the "consumer" of the other part, whereby it is mutually agreed as follows:—

1. The Company shall supply at the premises of the consumer, situate at aforesaid, high-pressure lamps of candle power each.

2. The lamps shall be provided and maintained by the Company and lighted and extinguished by the fitter; the total number of lighting hours being over 800 per annum. The lighting hours shall be as follows:—

Dusk to 9 p.m. on Mondays, Tuesdays, and Wednesdays.
Dusk to 10 p.m. on Fridays.
Dusk to 10.30 p.m. on Saturdays.

3. The charge for each lamp, including gas, maintenance, attendance, and hire of said lamp, shall be £ : : per annum, in quarterly instalments of £ : : , subject to a discount of 5 per cent. if paid within two months from quarter day. Payable in advance.

The lamps shall remain the property of the Company.

I hereby agree to the above-mentioned conditions.

As witness my hand, this day of 19

Name_____

Address_____

The lamps are lighted by the Gas Company's fitter. They are fitted with automatic lighting arrangements; and as soon as the compressor is started, the lamps light up. The hours of lighting (as you will notice from the agreement form) are from dusk to 9 p.m. on Monday, Tuesday, and Wednesday; dusk to 10 p.m. on Friday; and from dusk to 10.30 p.m. on Saturday; Thursday being the early closing day in Ilford. These stated times of lighting suited the majority of the shopkeepers. But there were one or two instances where shopkeepers closed their premises earlier than the hours stated; and we therefore had to overcome this slight difficulty with these particular shopkeepers. There is one instance in my mind where one of our largest shopkeepers closed his premises at 8 o'clock on Monday, Tuesday, and Wednesday, and 9 p.m. on Friday and Saturday. This consumer naturally raised the very important question as to why he should pay the same price as his neighbour whose premises were open much longer, and thus got two or three hours advantage per week out of the lighting. He did not feel inclined to pay for gas burnt when the shutters were down. As this shopkeeper was having his premises extended and altered at the time of our installing the system, it was just a question with him whether or not he would go in for electricity; the fact of his being able to switch out the electric arc lamps outside his shop as soon as he had closed his premises appealing very strongly to him. As this point affected a number of the other shopkeepers, we thought it advisable to draw up a scale of charges to overcome the difficulty; and a reduction was made according to the time of the extinguishing of the lamps. An agreed time being arrived at with the consumer as to the turning off of the lamps, the fitter goes round to these particular shops at that time and turns them off by means of a lever cock. The remainder of the lamps are shut down from the compressor room by the simple means of stopping the compressor. During sale times, should any particular shopkeeper desire to make a window show outside the specified hours or on Thursday evenings, he has only to inform us, and we run our compressor for his lamps at the slight cost of 1d. per lamp per hour.

The following four tables give the lighting rate for our 1000-candle power lamps, the reductions on the lighting hours varying according to the number of lamps in use by any individual consumer.

HIGH-PRESSURE LIGHTING.

Prices to be charged for One, Two, or Three 1000-Candle Power Lamps.
£4 per annum.

Hours of Lighting (approximately 820 per annum).

Mondays, Tuesdays, and Wednesdays . . .	Dusk to 9 p.m.
Fridays	Dusk to 10 p.m.
Saturdays	Dusk to 10.30 p.m.

Rate of Charge according to Reduction in Hours of Lighting on Above Hours.

Hours Less per Week	Actual Hours of Lighting per Year.	Reduction per Lamp per Year.	Cost of Lamp per Year.	Less 5 per Cent. Discount.	Net Cost of Lamp per Year.
		s. d.	£ s. d.	s. d.	£ s. d.
1	768	1 0	3 19 0	4 0	3 15 0
1½	742	1 6	3 18 6	3 11	3 14 7
2	716	2 0	3 18 0	3 11	3 14 1
2½	690	2 6	3 17 6	3 10	3 13 8
3	664	3 0	3 17 0	3 10	3 13 2
3½	638	3 6	3 16 6	3 10	3 12 8
4	612	4 0	3 16 0	3 9	3 12 3
4½	586	4 6	3 15 6	3 9	3 11 9
5	560	5 0	3 15 0	3 9	3 11 3
5½	534	5 6	3 14 6	3 9	3 10 9
6	508	6 0	3 14 0	3 8	3 10 4

For Four 1000-Candle Power Lamps.

Hours Less per Week.	Actual Hours of Lighting per Year.	Reduction per Lamp per Year.	Cost of Lamp per Year.	Less 5 per Cent. Discount.	Net Cost of Lamp per Year.
		s. d.	£ s. d.	s. d.	£ s. d.
1	768	1 4	3 18 8	3 11	3 14 9
1½	742	2 0	3 18 0	3 11	3 14 1
2	716	2 8	3 17 4	3 10	3 13 6
2½	690	3 4	3 16 8	3 10	3 12 10
3	664	4 0	3 16 0	3 9	3 12 3
3½	638	4 8	3 15 4	3 9	3 11 7
4	612	5 4	3 14 8	3 9	3 10 11
4½	586	6 0	3 14 0	3 8	3 10 4
5	560	6 8	3 13 4	3 8	3 9 8
5½	534	7 4	3 12 8	3 8	3 9 0
6	508	8 0	3 12 0	3 7	3 8 5

For Five 1000-Candle Power Lamps.

		s. d.	£ s. d.	s. d.	£ s. d.
1	768	2 2	3 17 10	3 11	3 13 11
1½	742	3 3	3 16 9	3 10	3 12 11
2	716	4 4	3 15 8	3 9	3 11 11
2½	690	5 5	3 14 7	3 9	3 10 10
3	664	6 6	3 13 6	3 8	3 9 10
3½	638	7 7	3 12 5	3 7	3 8 10
4	612	8 8	3 11 4	3 7	3 7 9
4½	586	9 9	3 10 3	3 6	3 6 9
5	560	10 10	3 9 2	3 6	3 5 8
5½	534	11 11	3 8 1	3 5	3 4 8
6	508	13 0	3 7 0	3 4	3 3 8

For Six or more 1000-Candle Power Lamps.

		s. d.	£ s. d.	s. d.	£ s. d.
1	768	2 10	3 17 2	3 10	3 13 4
1½	742	4 3	3 15 9	3 10	3 11 11
2	716	5 8	3 14 4	3 9	3 10 7
2½	690	7 1	3 12 11	3 8	3 9 3
3	664	8 6	3 11 6	3 7	3 7 11
3½	638	9 11	3 10 1	3 6	3 6 7
4	612	11 4	3 8 8	3 5	3 5 3
4½	586	12 9	3 7 3	3 4	3 3 11
5	560	14 2	3 5 10	3 3	3 2 7
5½	534	15 7	3 4 5	3 3	3 1 2
6	508	17 0	3 3 0	3 2	2 19 10

Note.—The above lamps can be lighted on Thursday by arrangement at the cost of 1d. per lamp per hour. This refers to special Thursday lighting during sale times, &c.

Some little time ago the Ilford Urban District Council made a strong bid for outside shop lighting in Ilford by means of flame arc lamps, and issued a circular, of which the following is a copy.

ILFORD URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The Council are now prepared to supply special lamps for shop-window lighting at the following reduced rates:—

1. *Intense Flame Arc Lamps, either Yellow or White Light.*—Candle power, 1500 (yellow); current, 6 amperes. Rates, including hire of lamps, maintenance, carbons, trimming, cleaning, and current—

	Three Lamps.	Four Lamps.	Five Lamps (in series).
For 500 hours per annum . .	£12 ..	£14 ..	£16
Extra hours over 500 at the reduced rate per hour of . . .	5d. ..	5½d. ..	6d.

Similar lamps, giving from 1000 to 4500 candle power, will, if required, be supplied on similar terms at proportionate rates. Quotations on application.

2. *High Candle-Power Metal Lamps in Lanterns.*—In cases where less than three lamps or where smaller lamps are required, special lanterns, containing lamps of from 100 to 400 candle power, will be supplied at the following special contract rates, including current and maintenance,

the lamps to be alight during ordinary hours when the shops are open:—

Candle Power.	Rate per Annum.	Payable in Quarterly Payments in Advance of
100	£1 10 0	.. 7s. 6d.
200	2 10 0	.. 12s. 6d.
300	3 10 0	.. 17s. 6d.
400	4 10 0	.. 22s. 6d.

Old gas-fittings adapted to take metal lamps.

Any of the above lamps may be inspected and further particulars obtained, &c., &c.

You will notice from this that they quote separate sums of £12, £14, and £16 for three, four, and five lamps respectively; their prices being based on 500 hours' lighting, with an extra charge per hour over this number. This quoting on the 500 hours' rate was rather sharp on their part, and no doubt they had a particular object in view when they fixed on this number of hours. At first sight, one would naturally imagine that their price was a very good one compared with the Gas Company's price, which was based on approximately 820 hours, which is a more likely figure for shop lighting. It was only when the consumer actually went into the figures and worked them out carefully, that he discovered that the price for the flame arc lamps was not so cheap as he originally imagined, particularly if he had a shop which necessitated keeping open to a late hour.

The Council's leaflet was also another of the reasons why we adopted these scales of charges; and you will notice that the amount of rebate given varies according to the number of lamps the consumers have in use. We have so far copied this principle in making our reduction charges. If you care to compare the charges quoted by the electrical department for their 500 hours and the charge which we make for 508 hours, you will find that our charge per lamp is less than the charge made for the electric lamps. We have up to the present only had to deal in this respect with the 1000-candle power lamps as this is the only size affected in this way to any great extent.

To look after the plant and the whole of the lamps, two men are employed—one in the evening to start the engine, see that the lamps are all lighted, attend to the engine and compressor during the lighting hours, and shut same off at the specified time. The other man is on duty during the day cleaning the lamps and attending to the renewal of mantles, globes, &c. This duty, however, only occupies him about two days in the week, and during the remainder of the week he is looking after the ordinary low-pressure shop lamps.

High-pressure gas is now becoming one of the necessities of gas-works distribution plant; and I have no hesitation in saying that had it not been for my Company launching out in the high-pressure scheme, we should certainly have lost a large number of our principal shops to the electricity department. The price charged is a reasonable one; the whole trouble being taken on the shoulders of the Gas Company, who, as I have already stated, clean, maintain, light, and extinguish the lamps, which is a great factor in inducing shopkeepers to take on this lighting. They have a perfect light, clear, and brilliant without flickering. It is there ready for them as soon as darkness comes on, and is turned off when they have no further use for it, and from one year's end to the other they have no occasion to give the lamps a thought. When one looks back only a few years ago before 54-inch pressure was brought into use, one can hardly realize the great strides that have taken place in so short a time; and it is owing to our present systems of high-pressure lighting that gas has regained its position in the largest city in Britain. It is an object-lesson for any one in the gas profession to walk down some of the main thoroughfares of London—such as Regent Street, Piccadilly, Pall Mall, and Whitehall—and there see the splendid examples of street lighting. When one compares the high-pressure lamps with their neighbours the yellow flame arc, there is no comparison; and one need not look twice to decide which is the better light.

In conclusion, I wish to state that I have not brought the subject of high-pressure lighting before you in order to go into the comparative merits of the different systems of high-pressure lighting on the market. The Keith and Blackman system being the one which I have adopted, and which forms the basis of my few remarks, is naturally the one on which I can speak from personal knowledge; and I trust the few particulars I have given have been of interest, and will probably influence some of the managers present to give high-pressure lighting a trial. I am confident that once tried always used, will be the result.

At the close of the paper, Mr. FARQUHAR said he should like to add that the members had no doubt noticed that the charge made for these lamps was a very low one. It was slightly less than he would have made it if they had not had anything but ordinary circumstances to consider. But the electric competition was very keen, and so they had to keep the price down to meet this. If Ilford prices were compared with those charged by the Gaslight and Coke Company, the Tottenham Company, and the Brentford Company, it would be found that at Ilford they were doing this work at a cheap rate. But they had no option in the face of municipal competition.

Discussion.

Mr. J. T. JOLLIFFE (Ipswich) said he could offer Mr. Farquhar congratulations upon the success which had attended his efforts. But, unfortunately, it did not fall to all their lots to have a place in which this business could be developed in the way that it had been at Ilford. At Ipswich, they were only able to get isolated high-pressure lamp customers in different parts of the town. Personally, he considered that one of the curses of the gas industry had been the low pressures at which they had been compelled to work for so many years past. He supposed this was part of the legacy to the industry from many years ago; and it would be a long period before they could come up to the high pressures that were destined to be the vogue. He considered this a misfortune, and perhaps a double misfortune, because in every direction all fittings and all pieces of apparatus with which they supplied their consumers were made to stand only these low pressures. And he was rather inclined to think Professor Hopkinson was about right when he said that probably 20 per cent. of the fittings employed by householders throughout the country leaked more or less. It might be only to a very infinitesimal quantity, but it was this infinitesimal quantity that worried and tormented the consumers, who then wished the gas at Halifax or some other place. He congratulated Mr. Farquhar very much on his paper. He was doubly interested in it because they had done a considerable amount of high-pressure lighting at Ipswich; and it had been most successful. But, unfortunately, they were rather late in the day in taking up this business; and by the time they did so, their electrical friends had taken away some of their consumers, and had been wise enough to bind these consumers to them for a long period. The Gas Company had, however, secured by the high-pressure lamps some of the lighting; and he thought there was no comparison between the qualities of the lights. High-pressure gas lighting was much preferable to the ordinary outside electric lamp—especially the arc lamps. There was, however, one very strong point that their electrical friends had over them, and that was the ease with which electric lights were turned on and off. Mr. Farquhar did not appear to have entered into this at all. He just had his own fitter go round and light up and extinguish the lamps day by day.* This appeared to him (Mr. Jolliffe) to be a positive disadvantage; and it should be, if possible, overcome. In fact, he felt one of the best things the Publicity Committee could take up would be to spend some money in perfecting a switch-behind-the-door system, because, after all, the success of electricity was largely due to its handiness. It was a fact that people liked to put their hands round the corner, and turn on the lights. In the case of the high-pressure lamps at Ipswich, they adopted electrical ignition; and he was sorry to say it was not a success, owing to many minor causes which he was afraid he could not quite explain. However, electrical ignition had been abandoned. None the less, they were hoping to get over the little difficulties with which they were at present handicapped. There was one paragraph that struck him in the paper. It said: "The lamps are lighted by the Gas Company's fitter. They are fitted with automatic lighting arrangements; and as soon as the compressor is started, the lamps light up." Would Mr. Farquhar explain what he meant by this? A little farther on he said: The fitter went round and lit the lamps and extinguished them at the time appointed. The author also explained to the members very fully the charges which he made for his high-pressure lamps; and perhaps he would kindly tell them what the cost of his gas was per 1000 cubic feet, so that they might compare it with what they were doing in their own towns. He was afraid Mr. Farquhar did not make a large profit out of the business, but perhaps he had advantages in other directions besides the one of a small profit.

Mr. JOHN YOUNG (Hull) added his congratulations to Mr. Farquhar for his excellent paper. It contained exactly the information required on this matter. Personally, he had only just succeeded in inducing the first tradesman in Hull to instal high-pressure lamps. They were a slow-moving people in Hull—very slow-moving indeed. Though he had had high-pressure lamps the past five years outside his premises, the first installation put in for any tradesman was only lighted up as a start on the previous Tuesday night; so that he (Mr. Young) was not able to say much as to cost of lighting, maintenance, and so on. The difficulty of lighting would undoubtedly be got over; and so long as the tradesman himself had no trouble with the lighting and extinguishing of these lamps, so long as the lamps were under the conditions that Mr. Farquhar had so well described—when the tradesman knew the light would be there when wanted, and when not wanted would disappear without any trouble to him—those were quite the right lines to go upon. Though his price was very low, Mr. Farquhar had taken care that his Company did not suffer in the least. This was also a right line. Another point was that in every area, large or small, he thought it would be found that limited areas parcelled out to separate small boosting plants suitable for supplying the area would be much better than one large boosting plant situated at a gas-works—say, a mile or two out of the town, and with a large ramification of high-pressure mains throughout the district. The time might come when they would be compelled to have the large area high-pressure system; but under present conditions, he thought that small areas, under separate supply by a boosting plant, would give them better control.

Mr. E. W. SMITH (Chelmsford) said he could not add any useful information to the discussion, because he had had nothing to do with high-pressure plants; but there were one or two points in the paper upon which he might ask questions. In the first place, he was surprised to hear that the original installation put in at Ilford gave an efficiency of only 30 candles per cubic foot of gas consumed. Something like this had been obtained from low-pressure

* Mr. Farquhar corrected Mr. Jolliffe in his reply to the discussion.

gas-lamps for some time past. There were, in fact, on the market low-pressure inverted lamps which would give 40 candles per cubic foot of gas. There was also the point Mr. Jolliffe had alluded to—the lighting and extinguishing of the lamps, which one would think might perhaps be done better, though there seemed to be a difficulty at the present time. It was certainly a point in favour of the electric light to be able to switch it on and off so easily. He could speak from personal knowledge with regard to this point. Further on in the paper, he saw that Mr. Farquhar shut off the lamps by stopping the compressor. He was rather curious to know how he effected it, because he imagined when the compressor stopped, the lamps would still be burning at low pressure.

Mr. H. Duesbury (Hertford), as representing one of the smallest companies who had taken up high-pressure lighting, thanked Mr. Farquhar for the excellent paper, and for the many valuable figures he had given the members. These would be useful not only to those who had taken up high-pressure lighting, but to those who were thinking of doing so. He had made a note to ask Mr. Farquhar what means of lighting he had adopted. He supposed it was the automatic bye-pass cock, whereby the bye-pass was kept alight at low-pressure, and when the compressor was started, the burner simply lit up by the increase of the pressure that operated the automatic bye-pass. There was a point as to the size of the lamps that he employed. They could not obtain anything like the amount of light from the same sized lamp with low-pressure gas as with high pressure. With an old-fashioned town like Hertford, the only possible method of lighting the outsides of shops was by small sized lamps at high pressure. By reason of the high-pressure lamps being so small compared with the candle power, they had been able to get much of the lighting from the Electric Company. The author spoke of his charges representing a small return. By this he (Mr. Duesbury) did not know whether he meant a small return on the gas, or over and above what he would obtain if the lighting was by low-pressure gas. There was another great advantage of high-pressure gas, especially in small and old towns, and that was the steady light right away through the hours of lighting. Altogether independent of works pressure, an absolutely steady light was obtained throughout, without any variation whatever. This was an immense advantage; and it was an advantage on the side of gas in the fight with their electrical friends.

Mr. E. G. Smithard (Kings Lynn) observed that one or two points had struck him. With Mr. Duesbury, he was attracted by the system of auto-lighting. Another point was the unit for small towns such as some of the members represented. It seemed to him that for such towns a 500-candle power unit would be more useful than some of the larger sized lamps that had been mentioned. He should like the author to state whether he had had experience of smaller units, such as 500 candles. Another point was as to what was his experience as to the cost of maintenance for glass and mantles and attention for (say) 1000-candle power units.

Mr. Duesbury asked to be allowed to add to his former remarks one or two additional points. At Hertford, they supplied high-pressure gas by means of a specially laid main through the town. But they had also an independent installation at a large printing factory; and he should earnestly recommend any of the members who were going in for factory lighting to put down a self-contained compressor. In the case of the factory he referred to, they lighted the whole of it last winter; and they did not put on a single new mantle, with 100 lights, throughout the winter. When one heard tales as to the heavy maintenance that had to be faced in connection with high-pressure gas lighting, it came as a surprise to him that, at a factory with wooden floors, and shafting suspended from the wooden floors, they did not have to put on a single new mantle right through last winter. Would Mr. Farquhar kindly mention the number of glasses and mantles he required for the various sized lamps? As to Mr. Smithard's remarks, he (Mr. Duesbury) found that 500-candle power lamps were preferable for small towns than larger units.

Mr. Jolliffe: 54 inches or 10 inches pressure?

Mr. Duesbury: 54 inches.

Mr. J. Davis (Gravesend) remarked that the question of high-pressure gas lighting was one that was very much to the fore; and it was a system that, to his mind, they ought to go in for very strongly. In his own case, he had no high-pressure lighting direct from the works, or from any particular station; but he had two shops to light. One of them was entirely lighted by electricity inside, and by 22 high-pressure 500-candle power gas-lamps outside, which, he agreed, was quite a sufficient power for advertising purposes, and for giving light outside shops. He had had experience of 1000-candle power low-pressure burners; and it had been an unfortunate one. On the other hand, he had a skating-rink where he had high-pressure lamps working at 72 inches pressure. They were in 150, 300, and 1500 candle power units. They were first lighted up eighteen months ago; and there had not been the slightest difficulty in any shape or form. With the lighting, every care had been taken. At first, it was on his mind as to whether he ought not to duplicate the plant; but there had been no difficulty whatever. The whole installation had been perfectly satisfactory. Then he had a Conservative Club in the town—a club with 800 members; and there he lit up the billiard-tables with six 150-candle power lamps over each one. In the case of the skating-rink, in his estimates, he allowed £10 for maintenance. It had not cost him anything like this amount; and in the case of the club, he had not to bother very much about maintenance, because it was really very small indeed. On the whole, from his experience, he was satisfied that high-pressure lighting was undoubtedly the thing to be got in. In his paper, Mr. Farquhar had given the size of his high-pressure main as 6 inches. But he did not say how many lights he expected to get off this 6-inch main. Certainly, for the number of lights mentioned in the paper, he (Mr. Davis) thought that a 4-inch main would have been quite sufficient. He took it there would be no difficulty whatever in raising the pressure up to 100 inches if needed; and this pressure could be toned-down to requirements by means of regulators or governors. An efficiency of 30 candles per cubic foot had been mentioned, which was in these days a low figure indeed. It should be at least 50 candles; and it was perfectly easy to get much over that. As to pressures, 60 to 65 inches was a most economical one to use. He tried 54 inches; and that was the pressure Messrs. Keith and Blackman recommended. He found, however, they obtained a better light, and a more satisfactory one, between 60 and 70 inches pressure.

The President (Mr. F. M. Paternoster) said he could only add to what other speakers had said his appreciation to Mr. Farquhar for his paper. Personally, he had had no experience with high-pressure lighting; so that he was unable to add any information to what the author had supplied, or to criticize any of the figures he had quoted. The paper, however, would be valuable to him later on.

Mr. Farquhar, in reply, said that in his remarks Mr. Jolliffe had spoken about the shutting-down of the lamps by the fitters; and he mentioned the statement in the paper: "The lamps are lighted by the Gas Company's fitter. They are fitted with automatic lighting arrangements; and as soon as the compressor starts, the lamps light up." He (Mr. Farquhar) did not intend by these words to convey to the members that the fitters went round and lit up the lamps individually. He meant that the lamps were lit by the fitter by merely starting the compressor; that the shopkeepers themselves did not light them. The lamps were fitted with an automatic bye-pass, and diaphragm and heater, patented by Keith and Blackman. As soon as the compressor was started, the automatic arrangement opened, the lamps lit up, and the heater was gradually heated up, until the light of the lamps reached the full strength. When the attendant turned off the compressor, he shut off the inlet and outlet valves of the compressor; but prior to doing so, he opened a small bye-pass which allowed the ordinary pressure to remain in the main, and this maintained the bye-pass. Mr. Jolliffe remarked on this subject of isolated lamps at Ipswich, and the fitters having to turn them off individually. At Ilford, they were certainly fortunately placed in this sense—all the high-pressure lamps being within reasonable distance of the show-room, and not being scattered as was the case at Ipswich, where there appeared to be three lamps here, three or four lamps half-a-mile away, and so on. Such an arrangement was, of course, a very inconvenient system. He might point out that the majority of the lamps were shut off at the compressor. It was only in the case of one or two shopkeepers who wanted their lamps extinguished at earlier periods, so as to obtain the advantage of the rebate, that the fitter had to specially extinguish the lamps by the overhead cock. Mr. Smith had remarked about the efficiency of 30 candles per cubic foot of gas by the old high-pressure lamps, and had pointed out that there were now lamps on the market giving 40 candles per cubic foot with low pressures. Mr. Smith must remember that the 30 candles per cubic foot referred to years ago, and with upright burners. Thirty candles per cubic foot was a good efficiency in those days; but now they could get 60 candles per cubic foot by means of the Keith-Blackman inverted lamp. His reply to Mr. Jolliffe about the automatic lighters would also refer to Mr. Duesbury's observations. But regarding Mr. Smithard's remarks, he (Mr. Farquhar) had not had any experience of lower units than 1000 candles, with the exception of one or two 600-candle power lamps which they had put in front of shop windows. In that case they used 600-candle nozzles in 1000-candle lamp bodies, just as he put 1000-candle nozzles into 1500-candle lamp bodies, for the reason that they found this practice resulted in a saving on maintenance. All his high-pressure lighting referred to outside shop lighting. He had no street lighting in any shape—not even low-pressure lighting; and from this members would recognize the character of the electrical competition he had to meet. But the fact that they had not a single street gas-lamp in Ilford was not for want of enterprise on the part of the Gas Company. They had offered the Corporation to do the street lighting for at least 15s. less per lamp than the electrical people, and give them a better light. But the Corporation would not entertain the proposal. It was against their principles. [Laughter.] In regard to the maintenance of the high-pressure lamps, taking the 1000-candle power lamps, he found, on the average, they used one globe, and about eight mantles, per lamp per annum. With regard to profit, it was difficult to get out figures; but he worked it out as near as possible. He might mention that the present price of gas in his district was 2s. 10d.; and it was coming down to 2s. 9d. at Christmas. The price obtained for these lamps just about balanced expenditure—that was to say, at 2s. 10d. they made a profit on the gas, and that was the small profit to which he referred in the paper. The competition they had to meet was very keen; and his Board were sensible enough to recognize that this parade lighting was an advertisement. The result was they did not look for profit, or rather for a big profit, on this branch of business. The Company were prepared to undertake the work, and keep it going not only for the sake of shutting out their

competitors, but it was a good advertisement for the Company, particularly in a place like Ilford, where they had no street lighting by which they could show the public what could be done. As to the size of the high-pressure main, this size was, of course, put in because, as no doubt the members were aware, Ilford was a rapidly growing place; and so a size of main was adopted large enough to meet the future extensions of this business. As a matter of fact, he hoped to extend the main to the High Road in the near future.

Mr. JOHN YOUNG (Hull) proposed a vote of thanks to Mr. Farquhar for his paper. He remarked that those of the members who had prepared papers knew that the difficulty was not the amount of knowledge they had for a paper, but to properly pick out just the particulars and information the members required, and to present it in the most useful form. Mr. Farquhar had succeeded in this admirably.

Mr. J. DAVIS (Gravesend), in seconding, said there was one matter he should like to mention, and that had reference to indoor high-pressure lighting. When they were lighting an interior with 70 or 80 inches pressure, if anything went wrong with the machine, the lights would go out; but if they were working as well with low pressure, the lamps would remain alight. He did not, however, think they need have any fear on this score in relation to high pressure. It was a matter that had given him considerable thought in connection with high-pressure lighting; and for the reason he had mentioned at first, he had great difficulty in recommending it, because he felt there must be a stand-by in case anything of the kind did occur, as these things would occur, at unexpected moments. In the particular club to which he had previously referred, he retained as much low-pressure lighting as possible, and with only one exception during the past eighteen months had it been called into use.

The motion was unanimously carried.

Mr. FARQUHAR thanked the members heartily for their vote. It had given him pleasure to prepare the paper. In matters of this kind, they were apt to forget little details; and in writing the paper, and looking up the particulars, there were brought to mind again several little points that had escaped memory. He found that preparing a paper was beneficial not only to those who heard it but to the one who wrote it.

MERTHYR GAS COMPANY AND THEIR WORKS.

By J. E. KENSHOLE.

[A Paper read before the Wales and Monmouthshire Institution of Gas Engineers and Managers.]

At the request for a paper from our respected Secretary, and as our meeting is held in Merthyr Tydfil, it might interest you if I gave you some little information about the Merthyr Tydfil Gas Company and their works. The Company was formed in the year 1836, under the title of "The Merthyr Tydfil Gaslight Company," for the purpose of supplying the town of Merthyr Tydfil and its suburbs with inflammable air or gas.

The works were built; and for years gas was supplied to the town and to Dowlais at 10s. per 1000 cubic feet. Being dissatisfied, however, some of the residents of Dowlais determined to form a company, and build a works to supply their district; the Merthyr Company agreeing to sell the mains, services, meters, &c. The cause of the dissatisfaction was the shutting off of the supply to Dowlais whenever the stock of gas was low, so that the town should be kept alight. This, I believe, occurred fairly often in the winter months. Under the circumstances, I think you will agree that they were perfectly justified in forming a Company, and having a supply of their own.

Shortly after the separation, there was a change in the management; and the next few years showed so considerable an improvement that, in the year 1867, notice was given that the Company intended applying to Parliament for statutory powers. The application was successful, and the Company obtained the Merthyr Tydfil Gas Act of 1868; the limits of supply comprising the whole of the parish of Merthyr Tydfil, in the county of Glamorgan (Dowlais excepted), and the village of Cefn Coed, in the county of Brecon.

AREA OF SUPPLY.

There seems to have been some doubt of the Company's intention to lay mains to supply the lower districts, as a proviso was put in the Bill which reads as follows:

> Provided that in case a company shall be formed for the purpose of erecting works, and supplying gas therefrom to the villages of Troedyrhiw, Abercanaid, and Gethin, in the parish of Merthyr Tydfil, and they shall, during the present year, commence and *bonâ fide* proceed with the erection and construction of the works necessary for that purpose, or, if any company shall at any time afterwards be desirous of erecting and constructing works and supplying gas to such villages, and shall of such intention give to the company six months' previous notice in writing, and shall, within twelve months from the expiration of such notice, proceed to erect such works, then, unless the company shall have previously proceeded with works necessary for that purpose, the limits of this Act shall not extend to such villages or places, or beyond the National school-room of the village of Troedyrhiw on the east side of the River Taff.

The Company laid the mains to supply Troedyrhiw; but since the passing of the Act, other townships have sprung up lower down the valley, and within the Company's limits of supply—namely, Merthyr Vale, Treharris, and Quaker's Yard. For some reason the Company did not extend their mains to supply these; and Merthyr Vale is at present supplied by Messrs. Nixon and Co., colliery proprietors, and Treharris and Quaker's Yard by the Quaker's Yard Gas Company. So that within the area of the Merthyr Tydfil Corporation there are four Gas Companies, whereas the whole of the area might, with advantage, have been supplied by one, especially when it is considered that the price charged for gas by the different companies to ordinary consumers varies from 2s. 9d. to 4s. 6d. per 1000 cubic feet.

EXTENSION OF WORKS.

The original works of the Merthyr Company were built on a plot of land of about half-an-acre, and small plots of adjacent land were purchased from time to time, as required, or as they came into the market, until, eventually, the works covered one-and-a-half acres of land of very irregular and inconvenient shape. The business of the Company had grown steadily; and in the year 1901 it became necessary to further extend. Having no surplus land, wewere compelled to discontinue the manufacture of sulphate of ammonia, to do away with the sulphate plant, and to use the building to house a carburetted water-gas plant. At that time, the gasholder capacity was slightly over 50 per cent. of the maximum day's output, there was just sufficient room to stock ten days' supply of coal, and the coke yard was not more than sufficient to stock four days' make. Under these circumstances, it will be obvious that the carburetted water-gas plant was a great relief, as it enabled us to run fewer retorts and to work them more regularly—making less coke, and ourselves using a larger proportion of what was made.

The output of gas continued steadily to increase; and in 1905 it was decided to purchase land and to erect works on an entirely new site. Application was made to Parliament, and powers were granted to erect new works and to raise further capital, under a sliding-scale, with a standard price of 2s. 9d. per 1000 cubic feet. There was, of course, some opposition by the Local Authority, who asked, among other things, that a purchase clause should be inserted in the Bill. This the Committee refused; but, after a hard fight, a suspensory clause was allowed—suspending the Act till the following January, to give the Local Authority opportunity to promote a Bill for compulsory purchase, which, however, was not proceeded with. The costs of promotion and opposition were much heavier than they might have been had the Corporation met the Company in a more reasonable manner.

The area of the site of the new works is about 7 acres, and as the main sewer from the town runs diagonally through the site, the buildings had to be arranged so that this would not be built over. There was a bridge and siding over the river from the Taff Vale Railway on to the site; and it was decided to strengthen the bridge and re-lay the siding, for use in taking the coal into the works and the tar and liquor away. Sulphate is not at present being made; but a plant will probably be erected in the near future.

THE NEW WORKS.

With regard to the building of the new works, the first thing to decide was, of course, the method of carbonizing—whether by inclines, horizontals, or verticals—and as at that time verticals were in a much more experimental stage than they are at present, I decided on horizontals, with machine charging. Having seen some of the more recent installations, I am inclined to think that, if I had to decide again, it would be verticals, as I believe they are the retorts of the future.

Retort-House.—This house contains eight beds of six through retorts, 25 in. by 15 in. by 18 ft. long. Each retort is charged and discharged in one operation by a Fiddes-Aldridge stoking machine. The machine opens and closes the doors of the coal-hoppers, and takes the supply of coal for each retort as it travels along on rails in front of the retort-bench. At the end of the bench there are a tar-tower and retort-house governor. The coal is discharged direct from the railway waggons into the breaker, and elevated into the bunkers in the retort-house; and the coke is discharged from the retorts into skips under the stage floor, where it is quenched before being taken into the coke yard. A telpher plant will shortly be erected, to deal with the coke in, I hope, a more satisfactory manner. The coal-breaker, elevator, and push-plate conveyor are worked by a vertical steam-engine; and the power for the stoking machine is generated by a gas-engine of 25 H.P. This will also generate the power for a telpher, when erected.

Condensers.—These, two in number, are of the water-tube type, and are worked under vacuum; the gas afterwards passing through a tar-washer and a rotary washer-scrubber. With regard to the latter, a slight alteration has been made since it was put in—the two halves now being separated. Ammoniacal liquor from the storage well is pumped through the first half, and clean water is run through the second half; the weak liquor from the second half going into the tar-washer, and thence to the storage well. The gas at the outlet shows no trace of ammonia; and the quantity of liquor sold has been considerably increased since the alteration was made.

Boilers and Water-Gas Plant.—There are two Lancashire boilers for supplying steam to the works. The carburetted water-gas plant is of a daily capacity of 300,000 cubic feet, and has been removed from the old works. This is not in regular use, but is kept in readiness for lighting-up when required. It is a great

convenience for taking up the peak load, and especially when putting into action or letting-down a bed of retorts.

Purifiers.—The purifiers, four in number, are of the water-lute type. The carburetted water gas and coal gas are purified and metered together. There is, however, a rotary meter to register the quantity of carburetted water gas made, before it is mixed with the coal gas. About 1½ per cent. of air is being admitted at the inlet to the condensers; but with ordinary grids, and working two layers of oxide, the purifiers have to be changed before being properly fouled, through excessive back-pressure. I intend now trying three tiers of oxide, instead of two, and hope to get better results.

Station Meter, Governor, &c.—The station meter is of 50,000 cubic feet per hour capacity. There are two governors, one 16-inch and one 12-inch, for the town and lower districts, respectively. The whole of the works' mains are 16 inches diameter. The gasholder is 600,000 cubic feet capacity, and spiral-guided. There is also at the old works one gasholder of 200,000 cubic feet, still in use.

The new works were started in December, 1909; but the manufacture of gas at the old works was not entirely discontinued till February, 1910. Some difficulties were, of course, experienced when starting-up; but these have been surmounted, and the whole of the plant now works very smoothly—the work in the retort-house being much lighter for the men than it was at the old works, where the charging and drawing were done by hand.

We, fortunately, never had any naphthalene troubles in the district while working at the old works; but since the commencement of the cold nights there have been several stoppages at the street lamps. Upon examination, we find they are due to small deposits of naphthalene at the lamp-cocks. These must, of course, be prevented with as little delay as possible. But the difficulty is to know which of the different methods to adopt as being the more economical and effective—whether to wash the gas with carburetted water-gas tar, and so take out the naphthalene at the works, or to carburet the gas with a suitable carrier, to prevent it being deposited in the mains and services. I was much interested to find that, in a paper read upon this subject by Mr. Ellery, of Bath, at the annual meeting of the Southern Association, held on March 10, 1910, he stated he had reverted to tar-seals in the hydraulic mains, and afterwards washed the gas with carburetted water-gas tar. Probably in these days of "Dellamore" tar-columns few will agree with tar-seals. The cure was effective, not only in preventing naphthalene stoppages, but it also lessened the trouble with stopped ascension pipes.

CO-PARTNERSHIP.

This year a co-partnership scheme has been introduced, which will, I hope, be of considerable benefit to the Company's employees.

The building of a new, and the scrapping of the old, works has, of course, meant a considerably increased capital; but it has been fully justified. There is now ample room for extensions, when required, and the Directors are convinced that before long they will be able to reduce the price of gas, which will, I believe, be the means of further increasing the output, to the benefit of the consumers, the employee co-partners, and the stockholders.

Determination of Hardness of Coke.

The report of the Zürich gas undertaking for the year 1910 contained, we are informed, some printer's errors in the description of the method of determining the hardness or firmness of the coke produced, which were partially reproduced in the summary of the report which was given in the "JOURNAL" for Aug. 15, p. 434. The method of determining the hardness or the firmness of the coke, according to the corrected statement which has now been sent, is as follows: The coke, after weighing, is discharged with a fall of 8·2 feet on to a cement floor, and then passed through screens of 1·8 inch and 1·2 inch mesh. Coke which gives from 70 to 80 per cent. of lumps which will not pass through the larger screen is regarded as of the standard degree of hardness. If a coke giving 75 per cent. of lumps which do not pass through the 1·8 inch screen is valued at x pence per cwt., a coke of which only 70 per cent. does not pass through the screen would be valued at $\frac{70}{75}x$ pence per cwt. This method of valuing the coke has formed a very useful corollary to the methods already adopted for valuing the coal received for carbonization.

North of England Gas Managers' Association.—The sixty-ninth half-yearly meeting of the Association will be held at Malton on Saturday, under the presidency of Mr. Henry Tobey, the Engineer, Manager, and Secretary of the Malton Gas Company. According to the programme issued by the Hon. Secretary (Mr. Herbert Lees, of Hexham), the members will meet in the Assembly Room, where they will receive a welcome from Mr. Alderman Metcalfe, J.P. The business will comprise the President's Inaugural Address, and a discussion on the paper by Mr. F. C. Willis, on "High and Low Pressure Distribution Schemes at Tynemouth," read at the spring meeting in Newcastle-on-Tyne, and given in the "JOURNAL" for the 9th of May (p. 375). At the close of the business, the members will dine in two parties at the Talbot and Green Man Hotels; and in the afternoon there will be an excursion to Castle Howard, which will be inspected by permission of the Countess of Carlisle.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

The Opening Meeting for the Session of this District was held in the Heriot-Watt College, Edinburgh, on Saturday. There was a good attendance, presided over at first by the retiring President—Mr. WALTER DUNLOP, of Kirkcaldy.

Mr. DUNLOP said that his term of occupancy of the presidential chair had now come to an end; and he would like to take the opportunity of thanking the members for the enthusiastic support they had rendered him during his term of office. The benefits of membership of the Junior Associations were becoming more and more widely recognized; and the increasing interest taken in them by the young men in the profession spoke well for its future welfare. He desired to thank the Hon. Secretary (Mr. W. Geddes, of Granton) for the keen interest he took in the work, and for his untiring efforts to further the interests of the Association. In introducing Mr. John R. Moyes, of Edinburgh, the new President, he said that Mr. Moyes had taken a deep interest in the Association since its inception.

Mr. JOHN R. MOYES, having taken the chair, said his first duty was the pleasant one of presenting to the retiring President the Association's medal as a memento of his term of office. They would all agree that Mr. Dunlop had occupied the presidential chair with great credit, and that he had carried on the work of the Association with marked zeal and energy.

Mr. DUNLOP acknowledged the gift in a few words.

PRESIDENTIAL ADDRESS.

Mr. MOYES then delivered his address, in which he said:

The Association has now entered upon its eighth session, with a membership of 99 (12 honorary and 87 ordinary), which speaks well for its vitality. In choosing a subject on which to address you, I encountered great difficulty, as almost all topics relating to the manufacture and distribution of gas have already been discoursed upon. I have, however, come to the conclusion that it may be of interest to you if I deal with the selection of a site for gas-works purposes, the proper disposition and housing of the plant, and some of the relative costs.

In the selection of a site, it should be borne in mind that it is well to avoid, if at all possible, water-logged and gravelly soils or running sand; to choose land adjacent to railway or water-way, or preferably both; and to have railway communication with more than one company, so as to obtain advantageous rates. Where coals and other materials have to be carted into and out of the works, the cartage for these add from 2d. to 3d. per 1000 cubic feet of gas to the cost of production.

The site having been decided upon, and surveys made and a general plan prepared, the laying down of railway connections should first be proceeded with, as this facilitates the transportation of building and other materials for the construction of the works. A sound permanent way should be constructed with a bottoming of 6 inches of hard ashes, finished with ballast consisting of broken slag or whin-stone, on which are laid first-class creosoted Riga sleepers (which cost about 3s. 3d. each), to which the chairs are fixed with spikes, and the rails laid in and tightened up with oak keys; the lengths of rails being joined together with fish-plates. The steel rails (weighing from 75 to 84 lbs. per yard) will cost about £7 per ton; and the whole sidings complete, including cross-overs, &c., can be reckoned at 35s. to 37s. 6d. per lineal yard. The railway might be put in cheaper than this, but is sure to prove more costly in the end.

The sidings should be laid down without dead-ends, so as to allow them to be continuous, in order to facilitate the handling of the traffic, and so designed that the waggons delivered into the works can be relieved according to the rotation in which they are received, thereby preventing delays and avoiding demurrage, which the railway companies now insist on charging for. They should also, where practicable, be put in in the form of a circle; so that the full waggons may be drawn forward in one direction, and the empty trucks carried forward and filled with coke, ashes, &c., and taken out in the opposite direction.

Simultaneously, the levelling of the site should be proceeded with. As far as possible, the excavating and levelling-up ought to be about equal, as where excavations have to be transported and a tip found for them, materials have to be imported for making-up; and the cost of construction is thus considerably increased. The cost of excavating and levelling-up should run about 1s. to 1s. 3d. per cubic yard for ordinary soil, with 2s. 6d. extra per cubic yard for rock. About the same time the drainage arrangements should be gone on with, and the pipes laid with a good declivity, at a sufficient depth to obviate interference with the foundations of buildings, or with pipes to be laid in connection with the plant. The dimensions of the sewer, of course, depend upon the nature of the ground, the area to be drained, and the extent of the manufacturing operations. The foundations for the various buildings required can then be set out. The cost of excavating them, allowing for timbering, will amount to about 1s. per cubic yard up to a total depth of 5 feet, and 1s. 3d. per cubic yard from 5 to 7 feet in depth. For rock in trenches, 5s. per cubic yard should be allowed, with an additional 3d. to 6d. per cubic yard if the surplus soil has to be wheeled away. The price for the concreting of the foundations (which may be in the proportion of 7 of broken metal to 1 of cement or thereby) would be

for trench work 9s. 9d. net per cubic yard, made up of one-third for labour, and two-thirds for material.

The building of the walls would next fall to be dealt with. These generally consist of brickwork in cement or lime mortar, and work out at about 6s. 3d. per superficial yard for 9-inch work, pointed on both sides, 9s. 2d. per superficial yard for 14-inch work, and 12s. 2d. per superficial yard for 18½-inch work—composed of sound, hard, well-burned, composition bricks. If faced with a first-class terra-cotta brick, the total cost would be 8s., 10s. 6d., and 13s. 6d. per superficial yard, respectively, all bedded and pointed with cement mortar, ground with hard clinkers, in the proportion of 1 of cement to 6 of clinkers, and the face work laid and pointed with breeze mortar 4 to 1. In making mortar with clinkers or hard ashes, 2¼ cubic yards of clinker will make, along with the cement, 1 cubic yard of mortar; but 2 cubic yards of breeze with an equal quantity of cement will make a similar quantity of mortar.

These proportions will be found, when well ground in a pan-mill, to make a first-class mortar. Three hours should be allowed to grind the clinker; but five hours will be required for the breeze. In the event of lime mortar being preferred, 3 to 1 will yield a good building mixture. [One ton of lime shells, when slaked, occupy 120 cubic feet.] The amount of mortar necessary for the building of the walls of the various thicknesses mentioned, will be approximately:

1·86	cubic feet	for	9-inch	brickwork	per	superficial yard.
2·43	,,		14-inch	,,	,,	,, ,,
3·00	,,		18½-inch	,,	,,	,, ,,

With stonework, about one-ninth of the cubic contents will be needed. Stone springer blocks, for roof-work or other purposes, finished complete, with holes for holding-down bolts, would cost about 4s. per cubic foot; but if these are made in concrete, the price would only amount to 1s. per cubic foot, which shows the enormous saving by adopting this composition.

At the Granton Gas-Works the roof of the retort-house is constructed on the elliptical girder principle, which may appear, at first sight, to be an expensive method. But if we take into consideration that it does away with the necessity of building high and heavy outer walls to carry a trussed roof and structural iron-work to support the various condensing pipes (which, in this case, are housed in the haunches of the girders), and also to leave the floor area clear of any obstruction, we are bound to admit that these advantages go a long way to repay the first outlay. The cost of the steelwork for a roof of this description amounts to about £15 10s. per ton, erected complete—the market value of steel being reckoned at (say) £7 15s. per ton; and the cost for labour at a similar figure—which, calculated on the area covered, works out at 14s. per superficial yard. The slating of a retort-house of this description should consist of large and heavy slates—say, 24 in. by 12 in.; and these should be tied on with copper wire, as wood-cleading cannot be considered in such a building. This slating work would cost about £7 10s. per rood of 36 superficial yards, while ordinary slates on wood-cleading would amount to £5 10s. per rood. The ground floor should be of concrete, well ballasted with 6 inches of broken stones, costing 4d. per superficial yard, and finished with 3½ inches of concrete, at 1s. per superficial yard, or 1s. 4d. per superficial yard complete.

Coal-sheds are generally situated adjacent to the retort-house for the convenient manipulation of coal for carbonizing, and the floor constructed of concrete similar to the ground floor of the retort-house. The roofing, which may be steel on the ordinary trussed principle, can be wood-clad, and the slates nailed to it. The wood-cleading may be taken at 3s. 6d. per superficial yard. Guttering and conductors cost about £10 per ton erected, and the lead flashing about £17 per ton, according to the market value at the time. Seven pound lead would be found suitable for gas-works buildings. The glazing with wire-woven, rough plate would cost about 3d. per superficial foot. Thirty-two oz. glass costs 5d. per superficial foot, and crown plate 1s. 3d. per superficial foot. Where the buildings, such as meter-house, offices, &c., require to be finished off inside, the expense of plaster work, including the fixing of a running cornice, scaffolding, &c., would come to 3s. 3d. per superficial yard.

Building of stone rough rubble walls for boundary or similar purposes, may be reckoned at 10s. 6d. per superficial yard (14-inch work), including cope. The price allowed by "Coleman's Architect and Engineers' Price Book" for buildings similar to those referred to, is 3¼d. to 3¾d. per cubic foot of capacity; whereas the actual cost at Granton Works was 2·36d. per cubic foot. It is usual in computing the cubical contents of buildings to measure from half-way down the foundations up to half the rise of the roof, multiplied by the extreme length and width. A complete record should be kept from day to day of all time and material employed in the construction of the works, so that the engineer may detect any unnecessary expenditure which is occurring, and take steps to have it rectified.

The Financial Department of a Gas Undertaking.

Mr. A. Canning Williams, the Treasurer and Collector to the Edinburgh and Leith Gas Commission, gave an address (which will be found on p. 46) on "The Financial Department of a Gas Undertaking." He said that a little more than two years ago two gentlemen occupied the position he now held. The Edinburgh and Leith Corporations' Gas Commissioners had a separate Treasurer and a separate Collector; but when the Commissioners went to Parliament in 1908 to secure a new Act, they obtained authority to amalgamate the two offices, and to concentrate the work of the Department under one official. He thought that the Commissioners, in so doing, had acted wisely, as when two gentlemen held positions of this kind it was difficult to know where the duties of one ended, and the duties of the other began; and, although it threw a greater responsibility on one individual when occupying the dual position, by training the heads of sub-departments he was relieved of a considerable amount of work.

POWER FROM GAS-WORKS BYE-PRODUCTS.

A paper, read by Herr Kutzbach, the Chief Engineer of the Augsburg-Nuremberg Engineering Works ("M.A.N."), before the General Meeting of the Bavarian Association of Gas and Water Engineers at Koburg, has been published in a recent number of the "Journal für Gasbeleuchtung;" and some points in it are of general interest, though many of the data apply only to German conditions.

The author tabulates the average calorific powers of coke, coke breeze, coal, brown coal or lignite briquettes, coal gas, producer gas and water gas from coke, producer gas from coke breeze and brown coal briquettes, tar, tar oil, oil-gas tar, and gas oil; and, at the prices for these products prevailing in Bavaria, he computes the price payable for 10,000 heat units derived from each of them. Since, however, coke is valued at 26s. to 28s. a ton, and coal at 20s. to 25s. a ton, and coal gas at 3s. 5d. per 1000 cubic feet, it is quite evident that the costs deduced for 10,000 heat units are not applicable to this country. On the author's data, the heat units in coal gas are considerably more highly paid for than in the other fuels. In Bavaria, the cheapest gaseous fuel appears to be producer gas derived from brown coal briquettes or from coke breeze. The author considers that the question of applying such producer gas for the heating of retort-settings on gas-works should be seriously entertained. Owing to the difficulty of utilizing coke breeze directly for heating purposes, it fetches a very low price relatively to the heat units contained in it.

Of liquid fuels, it is remarkable that at the price of 23s. a ton crude tar affords the greatest number of heat units for a given expenditure. There is practically no difference in the price of tar throughout Germany; whereas the price of coal ranges, according to the distance from the pits, from 10s. to 25s. a ton. The import duty on oil entering Bavaria prevents Galician oil competing with tar in respect of the price per 10,000 heat units. Tar oil is considerably cheaper than the imported Galician oil.

The author next considers the duty obtainable from the different fuels in power production. He estimates that the expenditure of heat in producing 1 H.P.H. with steam-engines with exhaust is 7000 to 10,000 calories, with superheated steam or steam turbines with condensation 4000 to 7000 calories, with gas-engines 2300 to 3600 calories, and with the Diesel engine 1850 to 2000 calories. On the basis of these assumptions, and the prices already mentioned for the different fuels, he shows that the cost of fuel per horse-power-hour is highest when coal or tar is used for firing steam-boilers, is rather lower when producer gas is used in gas-engines, and is very much lower when producer gas from coke breeze is used in gas-engines, or tar oil or oil tar or coal tar are used in the Diesel engine. From the figures given, the author concludes that the gas-engine is relatively an extremely cheap source of power if producer gas is made from coke breeze; while the Diesel engine is equally favourable when tar oil is applied in it. The Diesel engine shows to greater advantage if the coke-breeze producer is not in action both day and night. About ½ lb. of tar oil or crude tar serves for the production of 1 H.P.H. in the Diesel engine; and the author predicts that electricity works will have to obtain from the competing industry this, their cheapest, fuel for the production of current.

The author proceeds to refer to examples of installations in which coke breeze and tar or tar oil are used for power production. One type referred to is a coke-breeze producer as used by the Berlin Corporation gas undertaking, which has had at work, since 1909, three such producers at its No. IV. gas-works, and four such producers at its No. VI. works, each producer being for 200 H.P. These producers are clinkered mechanically once every 24 hours, and consume about 1·3 lbs. of coke breeze, under three-fifths of an inch in size, per horse-power per hour. At the Moosach Gas-Works at Munich, there are four similar producers supplying two 400 H.P. gas-engines, which serve as a reserve plant for the Munich electricity works.

The installations of Diesel engines referred to include a 200 H.P. engine using tar oil at a works at Nuremberg, which has been in action since August last, and on an average consumes 0·483 lb. of tar oil and 0·022 lb. of gas oil per horse-power-hour. Another installation is a 400 H.P. Diesel engine at the Tegel Gas-Works of the Corporation of Berlin which uses the oil-gas tar from the carburetted water-gas plant. A 1000 H.P. double-acting Diesel engine at the Municipal electricity works at Halle consumes tar oil, and is said to be the largest Diesel engine yet erected. A 100 H.P. Diesel engine at a works at Dahlhausen has been working since 1909 with tar as fuel, coke-oven tar having been used since the beginning of February last. This engine has used gas-works tar, both from inclined and vertical retorts, with satisfactory results.

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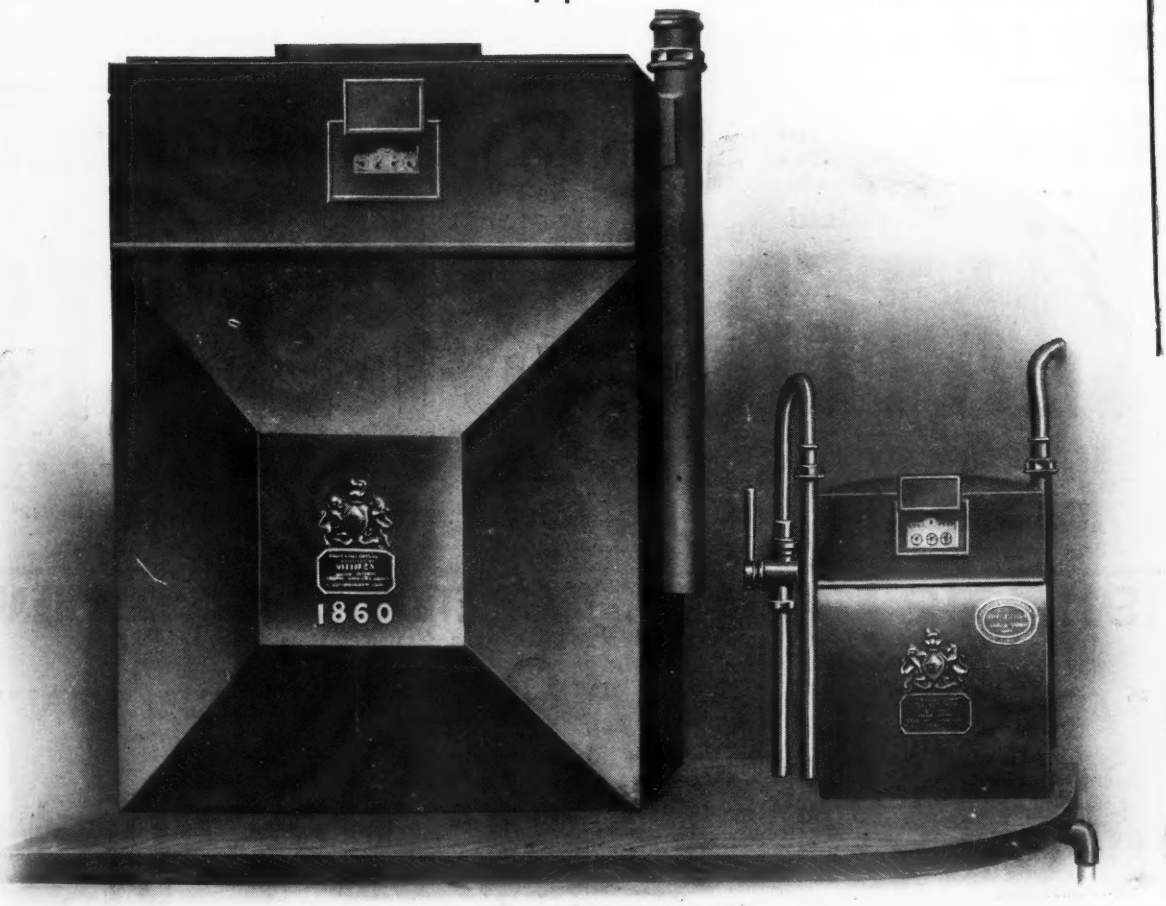

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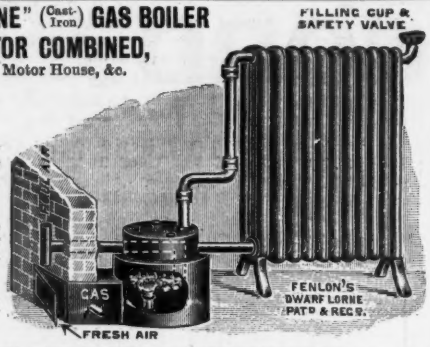

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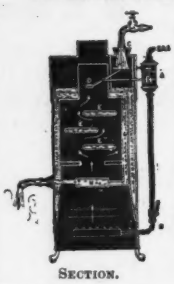
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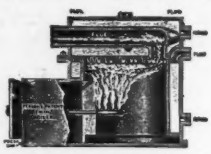

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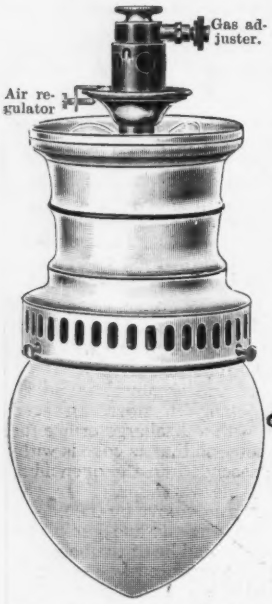

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LONDON AND SOUTHERN JUNIOR ASSOCIATION.

Visit to the Festival of Empire.

There was quite a large muster of members of the London and Southern District Junior Gas Association, and lady friends, at the Crystal Palace last Saturday afternoon, in response to an invitation from the Directors of the South Suburban Gas Company to tea at the Festival of Empire Exhibition. The hospitality of the Company was greatly appreciated—as was the opportunity subsequently afforded of closely inspecting the arrangements in connection with the magnificent installation of high-pressure gas lighting and of engines operated by town gas for the generation of electricity. On what was seen, there could be nothing but the highest praise to bestow. Mr. Charles Hunt, the Chairman of the Company, welcomed the members, and presided at the tea; and he was supported by Mr. S. Y. Shoubridge, the Engineer, who afterwards showed the party over the splendidly equipped power-house.

Before rising from the tea tables, there was a little appropriate speech-making, which was opened by Mr. J. G. Clark, the President of the Association, who, alluding to the name of the Exhibition, said at first sight there did not seem to be much relation between gas and the Empire. On second thought, however, it was not difficult to show that there was a very important relationship between them. Gas was employed for many purposes; but one of its most important uses was in connection with domestic affairs. It lightened the work of the home; and anything that tended to brighten home life was a benefit to the Empire. He was rather interested a few days ago to notice in the papers a statement by Mr. Masterman, Under-Secretary to the Home Office, who put gas-fires in the front rank of influences which were tending to increase the happiness of mankind. Then gas was also serving a great purpose in connection with industry, as was instanced by the wonderful machinery at the exhibition; and they must not forget the bye-products. Sulphate of ammonia was largely used in agriculture—a highly important industry to the Empire; and cyanogen was employed to work up prussian blue and cyanide, which was sent to the goldfields of South Africa. From the coal tar, too, came those aniline dyes which were in demand for multifarious purposes. As to the programme of the Association for the forthcoming session, it was, he felt quite convinced, one of which the members ought to feel proud.

A hearty vote of thanks was proposed by Mr. D. J. Winslow (the Senior Vice-President) to the Directors of the South Suburban Gas Company for their kindness and hospitality that afternoon; and with this vote he coupled the names of their patrons, Mr. Charles Hunt and Mr. S. Y. Shoubridge. As to the exhibition, Mr. Winslow remarked, it was a matter of congratulation that the Gas Company had laid down such an excellent power plant, which was unique in regard to size; while the installation of high-pressure gas lighting gave a much better illuminating effect than one was accustomed to see with electric flame arcs. The Hon. Secretary (Mr. E. Scears) seconded the proposition, and said that they were all gratified at the great success which gas had scored in connection with the exhibition—both in the matter of lighting and for generating electricity.

The vote having been carried with acclamation,

Mr. Charles Hunt thanked the members, and remarked that he need hardly say what great pleasure it had given the Directors of the Company to forward the programme of the Association in the way they had been able to do that afternoon. They recognized, he hoped to the fullest extent, the importance and value of associations such as that, which were formed for the purpose, not only of improvement and instruction, but also—what he considered to be of equal importance—of social intercourse and good fellowship. It seemed to him that there was no more important object to be attained than the intercourse between members—rubbing shoulders, as it were, together—so as to fit the younger members especially for the battle of life. They would probably at some time or other hold the destinies of the gas industry in their hands. Those who had grown old in the service, looked to the younger men to succeed them; and he was sure there could be no better training than that which such an organization as this could afford. Looking down the programme, he agreed with the President that it was one of which the members had reason to be proud. No doubt, great care and thought had been bestowed upon its preparation; and if it was carried out, it would be an education in itself. The President had asked what connection gas had with the Empire, and had answered it very effectively. He had shown that in almost every quarter of the globe industries were dependent upon the residuals obtained from gas manufacture. Perhaps the question might also be answered by asking another—What would the Empire be without gas? At any rate, it was a most important industry; and it was one which required in its service the highest faculties and intelligence. It was no longer possible to sit in one's office and wait for business. They had to go out and get it; and, with the growing competition, it was absolutely necessary that the highest commercial training should be applied. There was an object-lesson in the exhibition itself. If the Gas Company had felt inclined to sit still and do nothing, they might have kept a good deal of money in their pockets, but they would not have been able to show the world what gas was capable of. When the matter presented itself to them, now nearly a year ago, they had to consider it very carefully; and he might confess that it caused him one or two rather sleepless nights, because for a Company of the size of the South Suburban it was a very large undertaking indeed, and whether they would get anything out of it seemed problematical. But it appeared to them that if they did not undertake it, their competitors would do so; and therefore they stepped into the breach. He was very glad indeed to say that they had no reason whatever to regret the result. [Applause.] He need hardly tell them that a great deal in connection with the scheme had devolved upon their Engineer; and the Board attached the highest value to his services in the matter. Mr. Shoubridge would have, he was sure, much pleasure in showing the members what there was to be seen; but first of all they would no doubt like to hear from him some of the details, with which he was more conversant than he (Mr. Hunt) was himself.

Mr. Shoubridge then gave the visitors an interesting account of all that they would be able to inspect in the exhibition—describing the many items that would be likely to appeal to the feminine as well as the masculine mind. He expressed his pleasure at having an opportunity of meeting so many of the members and their lady friends, and of showing his sympathy with the objects of the Association; and he was also glad to tell them something about what the Gas Company had done. The principal thing that he thought would interest them was the power-house, where there were installed two 1000-H.P. vertical gas-engines, each with eight cylinders, and one of 750 H.P.—making altogether 2750 H.P. These engines were connected direct to dynamos, which delivered current at two voltages of 225 for the lighting and 450 for the power. The engines were all made by the National Gas-Engine Company; but the dynamos, which were huge constructions, were made by three different manufacturers, as it was impossible, in the time at disposal, to get any one maker in the kingdom to make the three. One was by Bruce Peebles and Co., another by the British Electric Company, and the third by the Lancashire Dynamo Company. These engines generated current for the lighting of different buildings and external decorative illumination, and for the illumination of some of the outer portions of the Palace grounds; and they also supplied the current for driving the "All Red Route" railway, as well as the power for working a number of the pumps for the fountains and for water-falls in connection with side-shows and the working of the "Eddystone" railway. The lighting of the grounds was by high-pressure gas. There were for this purpose altogether some 200 three-burner, two-burner, and single-burner lamps, varying from 4500 to 1500 candle power; and in the Palace itself the north end of the nave was also lighted by similar lamps, while the south end was illuminated by the best electric flame arcs. The electricians tried several kinds of lamps before they could get one that could compete at all with the gas-lamps; and he thought, when the members saw the two, they would come to the conclusion which most people had arrived at—that the high-pressure gas was far and away the more agreeable light. He might say that the lamps were supplied with gas at a pressure of about 90 inches of water; and they were lighted automatically. Altogether, he thought they would agree that the effect was exceedingly good. He had had very striking praise given to them by an important and impartial judge, the Chairman of the principal Gas Company in New York, who was over here a month ago, having made a tour in order to see the latest and best forms of street lighting. He had been to all the principal cities of Europe; and, after going round the Crystal Palace, he said this was certainly by far the finest lighting he had seen anywhere. He made arrangements immediately to have a number of these lamps sent over to New York; and it was probable that before long many of the principal streets in that city would be lighted in the same way as the Palace grounds.

Manchester University Lectures.—As recorded last week in the "JOURNAL," the series of these lectures for the session 1911-12 will commence next Saturday, when Mr. E. W. Smith, M.Sc., of the Birmingham high-pressure gas laboratories, will deliver the first half of his lecture on "High-Pressure Gas;" dealing with theory and practice in its application. The chair will be taken by Dr. Alfred Hopkinson, K.C., the Vice-Chancellor of the University.

Doherty's Process for Coking Coal and Obtaining Ammonia.—A recent number of the "Journal of the Society of Chemical Industry" contained a short abstract of the specifications of two patents taken out by Mr. H. L. Doherty, of New York, for apparatus for coking coal, producing gas, and obtaining ammonia. The apparatus comprises a closed coking chamber, arranged above a quenching chamber provided with a discharge orifice for the coke. The fuel column is continuous, so that as coke is withdrawn at the bottom, the hot coke descends into the quenching chamber, which is provided with suitable water-sprayers. The charge in the coking chamber is heated from above by the flames from downwardly inclined burners fed with air and gas under pressure. Gas outlets are provided at the middle of the height of the coking chamber. The ammonia-recovery process consists in coking the coal by direct contact with a gas-flame, passing the volatile products through the hot coke, and drawing them off with the steam formed by the quenching of the coke. By this means ammonia is obtained both from the nitrogenous volatile matter and from the nitrogen which normally remains in the coke. The ammonia is separated from the gases by treatment with an absorbing liquid, which may take the form of spray.

FINANCIAL DEPARTMENT OF THE EDINBURGH & LEITH CORPORATIONS' GAS COMMISSIONERS.

By A. Canning Williams, F.C.I.S.,

Treasurer and Collector to the Commissioners.

[A Paper read before the Scottish Junior Gas Association—Eastern District, Sept. 30.]

A few weeks ago, I received a letter from the Honorary Secretary and Treasurer of your Association in which he intimated that his Council desired me to give, at this your opening meeting of a new session, a short exposition of the work carried out in my department. It is with much pleasure that I comply with the request. If my paper is to deserve the adjective "short," it is impossible to go into much detail. I must, therefore, ask you to be content with an outline of the main features only.

It will assist you in understanding what follows if I preface my remarks with a few statistics in regard to the undertaking. At May 15 last (the date up to which the accounts are made up), the unredeemed capital consisted of annuities of the capitalized value of £894,567, mortgages amounting to £1,097,695, and a temporary loan of £1500—a total of £1,993,762. It is obligatory upon the Commissioners to create a sinking fund out of profits for the redemption of capital; and, since the year 1888, when the Corporations of Edinburgh and Leith acquired the old Gas Companies, £233,306 has been so redeemed. As the years go by, therefore, the capital debt will gradually diminish; and there is every probability that the next generation of gas consumers will obtain gas at a much cheaper rate, owing to the price not having to bear the cost of the capital charges.

During the last financial year, 1,671,768,000 cubic feet of gas were sold to 84,000 credit consumers, 70,628,000 cubic feet to 11,000 prepayment consumers, 150,472,000 cubic feet for street and stair lighting, and 2,397,000 cubic feet in bulk to outlying districts—a total sale of 1,895,265,000 cubic feet. It may interest you to know that there are only 16 gas undertakings in the United Kingdom that do a larger business than ourselves. My department consists of four sub-departments or branches—viz.: The consumers' clerks' office, collecting staff, counter staff, and the general office.

Consumers' Clerks' Office.

This is the largest branch. It consists of a staff of twenty-three, under the immediate control of a superintendent. Here are kept the 35 gas ledgers, in which particulars of the accounts of our 95,000 consumers are recorded, the public and stair lighting books, and the residuals and fittings ledgers. Credit consumers' accounts are, in the main, rendered three times a year for the respective periods January-February to April-May, April-May to October-November, October-November to January-February. Some of our credit consumers prefer to have quarterly accounts, while others have their bills sent in at monthly or weekly intervals. The prepayment gas ledgers, which are written-up from the prepayment collection books, are closed, summarized, and balanced quarterly.

The keeping of the accounts in connection with public and stair lighting involves a considerable amount of calculation, &c., owing to the burners being of various kinds, and to the fact that additions and changes are constantly being made. The charges are rendered monthly, as also are those for coke, tar, and fittings.

A good deal of time is occupied each day in posting payments to the various ledgers; nearly 300,000 items being dealt with in the course of a year. Other duties performed in this office include the checking and completion of the gas bills handed in by the meter surveyors, the annual making-up and crediting of discounts to large consumers of gas, the noting in the ledgers of changes of tenancy, and of the fixing, exchanging and removal of stoves, and the preparation of statistical returns as to gas and residuals.

In connection with this branch, two complaint inspectors are employed. These men deal with complaints in regard to charges made, and, by the exercise of tact and patience, often succeed in smoothing the ruffled feelings of irate customers.

Collecting Staff.

For the collection of the credit accounts for gas and stove-rent (meter-rent, except in a relatively few special cases, is not charged by the Commissioners) 17 collectors are employed. These men are paid a weekly wage, and also a commission based upon the number of accounts collected. The collectors enter up on loose sheets while on their rounds particulars of the payments made to them, and each afternoon they come to the office and pay over the cash to the cashier. The following morning the sheets, after having been examined with the counterfoils of the receipts issued and the castings checked, are sent to the consumers' clerks' office, and the items posted and analyzed. The sheets are subsequently bound up in book form and placed in the strong-room. As a general rule, the collectors exercise their own discretion in the matter of putting on pressure for payment; but in exceptional cases my advice is obtained.

The prepayment collection work is performed by a staff consisting of five collectors and five meter surveyors. The prepayment consumers are visited on an average eight times a year. The collector removes the cash from the boxes attached to the meters; and while he is counting it the surveyor makes the necessary entries in the collection book. In some towns considerable difficulty is experienced in disposing of the great quantity of coppers removed from slot-meters. In Edinburgh and Leith, however, the managers of the numerous branch banks are usually willing to relieve the collectors of their burdens from time to time during the day; and so it comes about that a comparatively small amount of copper finds its way into the office.

Counter Staff.

The duties discharged by the counter staff (which consists of a principal and four assistants) comprise the receiving of payments of gas and other accounts, and the entering of the items on the cash-sheets; receiving, recording, and repaying consumers' security deposits—some 6000 transactions per annum; interviewing consumers with regard to accounts; arranging the gas bills and issuing them to collectors; filling up bankruptcy and other forms; calculating collectors' commission, &c.

General Office.

This branch, which in some respects is the most important, is under the general superintendence of the accountant, who has a staff under him consisting of a cashier and bank clerk, an annuity and transfer clerk, and six others. In this office are kept the principal books of account—general cash-book, general journal, and, chief of all, general ledger. It is in this book that practically all the multifarious transactions of the department are brought to a focus, so to speak, and from which, in large measure, the annual abstract of accounts is compiled.

Among the many duties discharged in this branch are the receiving daily from the collectors and counter clerks of the cash taken by them, and the banking thereof, together with other moneys in respect of loans, rents, &c.; the checking of the cash-sheets; the keeping of the various registers in connection with the annuities, mortgages, and the superannuation fund; the examination as to calculations, &c., of creditors' invoices, and the listing of same for the Finance and Law Committee; the making out and transmission of cheques and annuity certificates and warrants; the filing of invoices, vouchers, and wages statements; the preparation of Board of Trade and other returns; and the payment of pensions and petty accounts.

Excluding moneys received on capital account, which in the course of a twelvemonth run into six figures, the total general receipts last year amounted to over £300,000, or, roughly speaking, £1000 per day. Payments are made to the bank daily; and at certain times of the year, I have a busy half-hour every morning in cheque endorsing. Last year the number of cheques received in respect of general revenue payments was over 14,000.

The whole of the work with regard to the annuities, of which there are some 1100, is performed in the financial department (principally in the general office); but the duties in respect of the mortgages are shared between the Clerk and my office. The annuities are paid in two equal half-yearly portions, at Whitsunday and Martinmas; the procedure being exactly the same as that in connection with the payment of dividends.

The mortgages, which number over 1300, and bear interest at 3, 3¼, and 3½ per cent., are issued for various periods—three, five, or seven years (mostly three); each mortgage being accompanied with six, ten, or fourteen interest warrants, as the case may be, which have been previously signed by a Commissioner, the Clerk, and myself. These warrants are presented at the bank half-yearly by the mortgagees or their agents, and, after deduction of income-tax at the current rate, are paid. Each Whitsunday and Martinmas a number of the mortgages mature, when it becomes necessary to renew or replace them to such extent as may be required. As will be readily understood, all this involves a great deal of correspondence and clerical work; but it is reduced as much as possible by the free use of printed letter-forms (put up in book form, and copies obtained by carbon paper) and other labour-saving methods.

A brief statement of the system adopted in keeping the records of the Commissioners' superannuation scheme may be of interest to you. On May 15 last, there were 768 employees under the scheme. Each employee contributes 2½ per cent. (*i.e.*, 6d. in the pound) of his salary or wages, the contributions being deducted from the salary or wages at the time of payment. The particulars of names, addresses, ages, salaries or wages, contributions, &c., of the members are recorded in four registers, arranged on the loose-leaf principle—a leaf being allocated to each member. Each leaf is ruled on both sides; and each side contains accommodation for five years' entries. One of the registers is called the "Left Service Register," and to it are transferred from time to time the records of men who have left the service. In cases where men are taken back into the Commissioners' employment, the records are removed from the "Left Service Register" and placed in their original positions. Once a year each member's salary or wages and contributions are summed and checked, and the individual balances extracted and proved with the cash-book entries.

Two card-indices are used in connection with the scheme—one arranged in alphabetical and the other in chronological order. The alphabetical index gives the name, date of birth, date of entering the service, occupation, register number, &c., of every man who is or has been on the fund, and enables quick reference to be made to the registers. The chronological index serves a double purpose. It shows at a glance the members who will attain the retiring age of 65 during the year, and is also of great assistance in the compilation of the annual return under the Friendly Societies Act, 1896.

The system with regard to creditors' accounts is as follows:

The invoices—after having been certified as to materials, prices, and calculations—are listed once a month, and a printed copy of the list forwarded to each Commissioner a few days before the meeting is held at which they are passed for payment. The great majority of the accounts are for goods supplied at contract rates, and as a rule not many questions are asked in regard to them. But the sending of the printed list enables the Commissioners to see exactly what has been purchased, and gives them the opportunity of seeking further information if so minded. The cheques are made out, perforated as to amount by an ingenious appliance aptly styled the "Protectograph," and despatched. A form is printed on the back of the cheques, which, on being signed by the payees, fulfils the double purpose of an endorsation and a receipt. The cheques are afterwards obtained from the bank, and filed in volume form by means of a mechanical binder. The invoices are also filed in this way.

Correspondence, &c.

A brief reference should be made to the system followed with regard to correspondence. The superintendent of the consumers' clerks' office deals with the majority of the letters which relate to his branch; and the annuity and transfer clerk attends to those referring to formal matters in connection with the annuities. The more important letters, and those which are not of a formal or routine character, are attended to by myself, with the assistance of a shorthand-typist. My letters are copied on a mechanical roller copier, and once a week or oftener they are removed from the machine and filed in order of date, together with the letters to which mine are replies—reply following letter in each case. I have three sets of letter files in use—one in connection with annuity and mortgage business, the second for general correspondence, and the third (the vertical system) for special correspondence and papers. I have used for some years vertical files for special correspondence and documents, and find them most helpful, as they allow of papers being classified according to subject. The files (each of which bears a progressive number) are placed, after endorsation, in an upright position in a cabinet, and are indexed on the card-index plan. It is a method which, considering the Britisher's habit of looking somewhat askance at innovations, is coming into favour, and has only to be tried to be adopted.

A Little Homily.

In the few minutes that remain to me, perhaps you will allow me to read you, or at all events the younger members, a little homily. A knowledge of accounts, even though it may not be very extensive, is a useful addition to a man's equipment, be his calling what it may. There are excellent and cheap books to be obtained which deal with book-keeping and accountancy. To study these is good; but if the student will apply the principles of double-entry book-keeping to his own private finances, and take out each year a balance-sheet, he will gain a practical knowledge which scarcely any amount of mere text-book reading will afford. The great thing is to bear in mind that principles apply equally to small as to large matters; and if a young man will himself wrestle with accountancy problems, and solve them, he will have possessed himself of knowledge in that best of all ways—at first-hand and by the sweat of his own brow.

Twenty years ago, I was in a certain gas office as assistant to the accountant. He was an old gentleman who scarcely spoke a word to me the live-long day; and to all my offers of help he gave the unvarying and discouraging reply, "No, Sir, thank you." I saw clearly enough that he did not wish me to know more than he could help of his special work, and so, foreseeing that there would be no promotion for me if I did not acquire a knowledge of the technicalities of book-keeping, I set about teaching myself. The first thing I did was to prepare an inventory of my possessions, and make out a balance-sheet. Then I bought a cash-book, journal, and ledger, and kept my private accounts with all possible care and accuracy and on double-entry principles—a practice I have maintained to the present day. A few years later, the old accountant retired, and I was promoted to fill the vacancy. Had I been passed over then, as I am quite sure I should have been if I had not mastered the principles of book-keeping, my business career would have been, I fear, a poor and humdrum one, for that promotion led to others.

I offer this little bit of personal history not in a boastful spirit, but because there may be those here to-day to whom it may be not without influence and help.

At the conclusion of the reading of the paper, Mr. Williams exhibited to the meeting some of the appliances and forms that he had referred to. Subsequently,

Mr. R. J. Philp (Dunfermline) said that, with reference to Mr. Williams's remarks as to the use of carbon paper, they, in Dunfermline, made out all their consumers' accounts by the use of carbon paper; one copy being handed to the consumer, and the other retained for office use.

Mr. R. W. Cowie (Dalkeith) thought there were few gas-works where the accounts were kept with such a wealth of detail as in Edinburgh. He had been thinking, when examining the letter-book handed round, that he had started keeping a letter-book on the same system more than a year ago, and there was yet room for six months' letters. In some gas-works very little was done in the way of keeping statistics. At a meeting of the North British Association, Mr. Dickson, of Forfar, read a paper on the checking of the working costs of a gas-works, which, to him, was most interesting; and since that time, he had, in a small way, calculated, for his own private information, the working costs in his works. The time and labour given to this occupation were well spent.

Mr. W. M. Williamson (Penicuik) found the old method of keeping a record of his correspondence quite satisfactory for his purpose.

Mr. W. Geddes (Granton) said he was a firm believer in push-ahead methods and labour-saving devices in relation to clerical work. There was, however, one point on which he would like Mr. Williams's opinion, and this was with regard to the legal value of carbon copies of letters. It was quite conceivable that correspondence might play an important rôle in the Law Courts; and a carbon copy might not be a true copy of the original. Did Mr. Williams think a Judge and Jury would recognize its legality?

Mr. Williams said he was very glad this question had been raised. He did not wish to give the impression that all the letters sent out from his department were copied by means of carbon paper. It was only those of a formal character that were done in this way. Letters on important matters were typed, signed, and then copied in the usual manner; and the copy, with the original letter to which it was an answer, was filed away. As to whether carbon copies were legal or not, he had doubts on the point. He thought that if the opposing side were to challenge such a copy, some difficulty would be found in proving it to be an actual copy of the letter sent. On the other hand, where a certain system was in vogue, and was recognized as being a system, and if the firm was reputable, the Judge would not readily set aside a carbon copy. It was, however, a difficult point; and he advised press or roller copies of all correspondence that was ever likely to figure in a law case.

The President referred to the time when carbon copies were regarded as an innovation.

On the motion of Mr. Alex. Bishop (Newtongrange), a hearty vote of thanks was accorded Mr. Williams for his lecture.

Mr. Williams, replying to the vote of thanks, said it had been a great pleasure to him to come there. He thought Junior Associations were doing good work by enabling men in subordinate positions to obtain knowledge; and knowledge was power. When he first entered the gas profession, thirty years ago, there was not the same freemasonry among gas managers; and anyone entering their works was regarded as desecrating the place, and walking on holy ground. But nowadays a much better spirit prevailed—a sort of brotherhood—and the gas managers he now met were always glad to give information to their juniors. Hitherto, it had been said that money was made in the retort-house; but he thought a good commercial system on the financial side saved money and brought money in in a regular and satisfactory way.

Rebates to Large Consumers of Gas in Berlin.

An agreement has been arrived at (which came into effect on Aug. 1) between the Imperial Continental Gas Association and the Berlin Corporation gas undertaking, by which, in addition to the rebate of 5 per cent. already allowed for gas consumed for other than lighting purposes, a scale of further rebates has been adopted by the two undertakings for annual consumptions in excess of certain quantities. The present price of gas in Berlin is 13 pf. per cubic metre (3s. 8d. per 1000 cubic feet). For gas used for motor purposes, and for the supply of hot water to whole blocks or to separate houses from a central heating plant, a rebate of 20 per cent. is allowed, irrespective of the amount of gas consumed. Independently of this, gas consumed in business premises and factories other than for lighting purposes gains a rebate ranging from 10 to 20 per cent. according to whether the annual consumption is in excess of certain figures—viz., 50,000 cubic metres (about 1,766,000 cubic feet), 10 per cent.; and 300,000 cubic metres (about 10,595,000 cubic feet), 20 per cent. The object of the latter scale of rebates is to retain as consumers of town gas large business houses and factories which otherwise might instal water-gas or producer-gas plant for their own use. The rebate for central supplies of hot water is granted by way of securing the heating of the central boilers which are now installed in all modern buildings in Berlin and suburbs for the supply of hot water to tenants. The economy of gas as a heating agent for such purposes arises from the fact that by apparatus, as devised by the German Continental Gas Company and others, the gas consumed is automatically controlled according to the varying demand for hot water.

Masonic.—The annual meeting of the Provincial Grand Lodge of Warwickshire Freemasons was held on Monday last week, in the Grosvenor Rooms of the Grand Hotel, Birmingham. The Provincial Grand Master, the Marquis of Hertford, conferred the rank of Past Provincial Warden on W. Bro. A. J. Lawrence, the Chairman of the Rugby Gas Company. Bro. Lawrence is a P.M. of the Lodge of Rectitude, No. 502, and a P.Z. of the Chapter of Rectitude. W. Bro. Charles Dakin, of Cradley Heath, has been appointed Provincial Grand Senior Warden of Worcestershire. This makes three Provincial Grand Senior Wardens in the newly-consecrated Murdoch Lodge—viz., W. Bro. Charles Meiklejohn, of Rugby, who is P.P.G.S.W. of Warwickshire; W. Bro. Bloomer, P.P.G.S.W. of Worcestershire (the Senior Warden of the Murdoch Lodge); and now W. Bro. Dakin P.G.S.W. of Worcestershire (the Junior Warden).

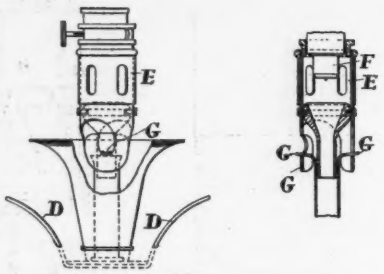
REGISTER OF PATENTS.

Inverted Incandescent Gas-Burners.

HANDS, G., and TURNER, F., of Farringdon Road, E.C.

No. 19,414; Aug. 18, 1910.

This invention aims at providing "more efficient means for preventing the heat generated by the bunsen flame at the lower end of the burner-tube from being transmitted, by the conductivity of the burner itself, to the gas bracket—or the like—thus preventing the latter from becoming discoloured by the heat."



Hands and Turner's Inverted Burner.

The burner-tube (as shown) is suspended from the mixing-chamber E in connection with the gas-delivery nozzle F, by an open suspension joint, "which will not conduct the heat, and will at the same time allow of the burner-tube having a certain amount of free movement." The upper end of the burner-tube is provided with gudgeons G, and the lower end of the mixing-chamber has hooks to hold the gudgeons. The burner-tube thus hangs free to move or swing. It will therefore always hang plumb, and can be removed at any time without removing the mixing-chamber or injuring the mantle. The upper end of the burner-tube is connected to the mixing-chamber by a connecting sleeve or nipple J, situated within the suspension joint. It is provided with an enlarged upper end to fit loosely in the interior of the mixing-chamber, and with a reduced lower end to fit in the upper end of the burner-tube. This sleeve or nipple is formed of earthenware, asbestos, or some other non-conductor of heat; and, if preferred, heat insulating material may also be introduced between the gudgeons G on the burner-tube and the hooks on the mixing-chamber E.

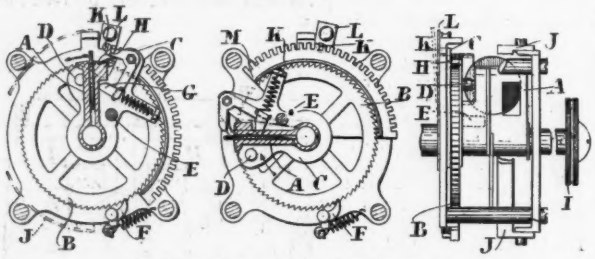
In this way, the burner-tube is thoroughly insulated from the mixing-chamber E; and the heat cannot therefore be conducted to the gas fixture. At the same time, a flexible joint is provided which will permit of a certain amount of free movement of the burner-tube, and the parts carried by it, without allowing of partial rotation of the parts, and the consequent displacement of the disperser D relatively to the gas fixture.

Prepayment Devices for Gas-Meters.

SUTHERLAND, A. G., of Birmingham.

No. 21,461; Sept. 15, 1910.

This prepayment device for gas-meters provides controlling mechanism for the pawl whereby motion is transmitted from the coin-carrier o the mechanism for operating the gas-valve.



Sutherland's Prepayment Meter Device.

The illustration shows a sectional elevation of the apparatus with its parts in the position where the coin is just inserted; with the coin-carrier and operating mechanism in a different position; and an end elevation.

Any ordinary form of rotary coin-carrier A is employed; and coaxially with it is mounted a ratchet wheel B and a lever C carrying a pawl to engage it. Motion is imparted in one direction to the pawl lever from the coin-carrier by the abutment of the coin inserted in the carrier against a shoulder D on the lever; while motion is imparted in the opposite direction by the abutment of the carrier itself against another shoulder E on the lever. During the motion of the lever under the action of the coin, the pawl on C engages the ratchet wheel and rotates it through a pre-determined distance; while motion in the reverse direction is prevented by a locking pawl F pivoted on the frame of the mechanism, and actuated by a spring.

To prevent the return of the carrier while the coin is lodged in it, a check lever (of bell-crank form) is pivoted on the pawl lever, so that one end G provides an abutment for the coin and the other H prevents the pawl from rising out of engagement with the ratchet wheel. If a rearward effort is applied to the handle I, whereby the coin-carrier is rotated, the coin presses against one end of the check lever and causes the other end to press upon the pawl. Since the pawl cannot then rise out of engagement with the ratchet wheel, and the latter is held by its locking pawl F, no motion can be imparted to the coin-carrier, and any fraudulent operation of the mechanism through the medium of the coin is prevented. When the carrier reaches the end of its motion the coin falls out, and the carrier is then free to return with the pawl lever to its original position; the coin being prevented from falling out of its holder by an arcuate strip J attached to the frame.

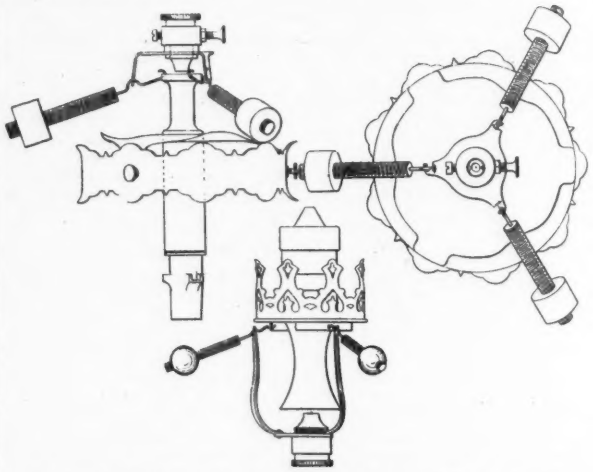
The arc through which the coin-carrier moves is constant; but in order that the movement imparted to the ratchet wheel may be varied to suit the varying price of gas, a segmental guard is mounted over the ratchet wheel and arranged to prevent engagement of the pawl with the wheel during the earlier part of the movement of the pawl. The guard is pivotally mounted coaxially with the ratchet wheel, and is notched around one edge or else mounted on a peripherally notched disc which is secured by the engagement with one of the notches of a pin or catch K on a fixed spring arm L. By this arrangement, the guard can be adjusted to any required position. In the initial position of the pawl it rests upon the guard, and does not engage with the ratchet wheel until it has been moved past the end M of the guard by the action of the coin-carrier.

Incandescent Gas-Burners.

ZECHNALL, L., of Bunhill Row, E.C.

No. 22,951; Oct. 4, 1910.

This invention has for its object to provide an anti-vibration burner or an anti-vibration device for suspending burners—the portion which carries the mantle (with or without the shade or globe) being supported on, or suspended from, a "plurality of radially disposed counter-weighted levers."



Zechnall's Anti-Vibration Arrangement of Incandescent Burners.

In the inverted burner arrangement, the depending tube which carries the mantle and the globe is separated from the gas jet or nozzle part, and is supported therefrom upon the inner ends of outwardly extending arms provided with adjustable counterweights at their outer ends—the arms being supported at a convenient position in their length upon suitable fulcrums provided by the hooked ends of a three-armed bracket attached to the fixed portion of the burner. The mantle and globe-carrying part are capable of both vertical and lateral freedom of motion under the restraining and balancing action of the counter-weighted levers; the only points of connection between the suspended and fixed parts being the fulcrums on which the lever arms rest.

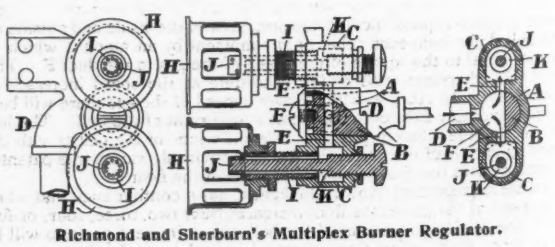
In applying the invention to upright burners, the mixing-tube and mantle-carrying part (with or without a globe) rests upon, or is supported or suspended from, counterweighted levers similar to those used for the inverted burner. The base of the mixing-tube may rest upon the inner ends of the levers; the latter taking their bearing in bracket-like arms, while the gas injection nozzle projects upwardly into the open end of the mixing-tube.

Gas-Burner Taps.

RICHMOND GAS STOVE AND METER COMPANY, LIMITED, and SHERBURN, W. H., of Warrington.

No. 23,008; Oct, 5, 1910.

This multiplex gas-burner is of the type in which one tap will supply either one or both of a pair of burners, or shut it off entirely.



Richmond and Sherburn's Multiplex Burner Regulator.

A represents the casing of the tap proper; B the plug of the tap; and C the branches or body parts to which gas is supplied from the casing. These are on opposite sides of the casing; while the main

inlet or supply branch D enters the casing practically at right angles to the plane in which the casing and parts lie—that is, at a point intermediate to the parts C. The ports E, by which the gas enters the body parts, are on opposite sides of it; and the plug of the tap is provided with a groove or port F, of such a form that when the plug is turned in one position it will communicate with the port D and both the ports E, and supply gas to both the casings. When, however, it is turned a quarter of a revolution, it will supply gas to only one of the branch bodies C and burners. Then by a further quarter of a revolution (making a full half revolution in all), the port of the inlet branch D will be closed completely, and the gas cut off.

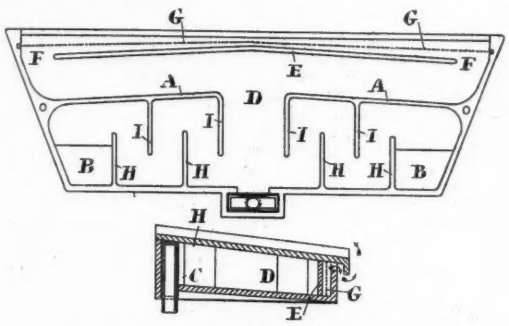
The mixing-tubes of the burners supplied with gas will be coincident with the axes of the branch bodies or casings C; and the inner end of the mixing-tubes will fit within the grid or perforated sockets H, which supply air to the gas delivered. These parts are carried from the branch bodies or parts C, by tubes I, which screw into the casings and on to the outer end of which the sockets H screw, for adjustment as desired. Within each of the tubes I is a threaded gas-adjusting rose plug J, the shoulder K of which works in connection with the inner end of the tube I. By adjusting it in relation thereto (by turning the head of the plug J from outside), the amount of gas supplied to the respective burners can be regulated.

Atmospheric Gas-Burners.

COFFIN, A. G., of New Bond Street, W.

No. 28,154; Dec. 3, 1910.

This atmospheric gas-burner is said to ensure very efficient mixing of the gas and air, and to prevent back-firing and the ignition of the gas as it issues from the gas-inlet.



Coffin's Atmospheric Stove Burner.

The burner is made in the form of a closed box adapted to fit in a gas-stove or cooking-stove, or to be placed on the bars of a grate. The box is of flat rectangular shape, and is provided, preferably at the back, with an inlet from a source of gas supply. At a suitable distance from the rear side of the box is a partition A, forming a compartment, in the bottom of which (at each end) are the air openings B, and in the middle of the rear side of which is the gas-inlet opening C. Opposite the inlet is an opening D, for the mixture of gas and air to pass through on its way to the openings at which it is ignited; and opposite D is a deflector E (preferably inclined from its middle to each end), ways F being left for the mixture of gas and air to pass between the ends of the deflector and the ends of the box itself. In the passages thus formed there may be baffles arranged to form a zig-zag course to further mix the gas and air. Between the deflector and the openings where the mixture is ignited, there may be a wire-gauze or perforated screen G, to distribute the mixture before it reaches the openings.

The compartment into which the gas and air enter has, between the air inlets and the gas-inlet, baffles, preferably arranged in two series—one H projecting from the rear side of the box, and the other I from the opposite partition. These form circuitous or zig-zag passages for the air on its way to meet the gas.

Recording the Speed and Delivery of Gases.

BOUFFART, M., of Herstal-lez-Liege, Belgium.

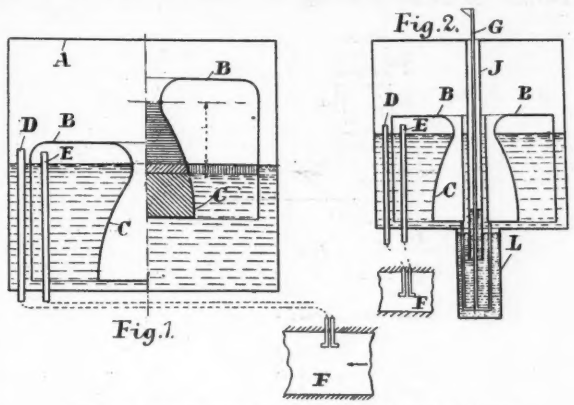
No. 993; Jan. 13, 1911.

This apparatus for recording the speed or delivery of gas is of the type having a bell and float operating in conjunction with a Pitot tube—the movement of the bell being proportional to the velocity of the gas.

Fig. 1 illustrates the peculiar contour of the float employed. Fig. 2 is a vertical section of the apparatus itself. This comprises essentially a tank A containing liquid in which dips a bell B with a float C. The internal cavity of the bell and the external space communicate with the gas-duct F through the two branches E D of a Pitot tube. Under these conditions (as is known), the pressures on the inside and outside of the bell differ from each other at any moment by an amount which is proportional to the square of the speed of the gas in the duct F. The bell will, therefore, rise or fall according as the speed increases or diminishes. In other words, for every speed of the gas there will be a correspondingly different position of equilibrium of the bell. The law connecting the different positions of equilibrium of the bell B with the varying speeds of the gas in the duct F, obviously varies (the patentee remarks) with the cross sectional contour of the float C.

In the arrangement shown, the float C has a contour such that when the speed of the gas in the duct increases (say) two, three, four, or five fold, the vertical movement of the bell above its zero position will be two, three, four, or five times as great. In other words, the contour of the float is such that the height through which the bell rises will always be equal to the product of the speed of the gas in the duct multiplied by a constant.

For the purpose of recording outside the tank the vertical movements of the bell, a rod G ending in a pen is connected to the bell, whereby the pen is caused to draw a diagram whose ordinates represent the vertical movements of the bell, and consequently the speed of the gas in the duct F on a strip of paper wound on a drum rotated at a uniform speed by clockwork. In the apparatus shown, the means for connecting the penholder rod to the bell, without allowing any communication between the interior of the tank and the atmosphere, comprises a tube J forming part of the wall of the tank. The penholder rod extends through this tube, and is capable of moving freely in it. The lower end of the tube J dips constantly into a receptacle L, containing a very dense liquid—such as mercury, for instance.



Bouffart's Recorder of the Speed and Delivery of Gases.

The difference between the levels of the mercury inside and outside the tube J is greater the greater the difference between the static pressure in the pipe D and the pressure of the atmosphere. Owing to the great density of mercury, the difference between the levels is always so small that there is no necessity for the tube J (and consequently the apparatus itself) to be made of bulky dimensions. Further, since the pressure of the atmosphere acts only upon the cross section of the rod G, which is very small, the extraneous force caused by the pressure is inappreciable, and therefore there is no need for any compensating device such as is necessary in existing apparatus of this type.

The receptacle L may have any position relative to the tank. In the case of very high pressures in the duct, it is preferred to place the receptacle underneath the reservoir—for example, in the axial line of the bell as in fig. 2.

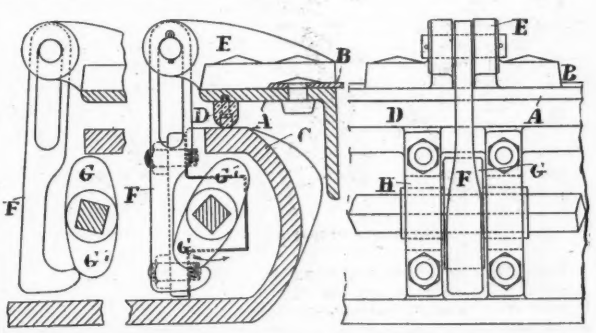
The peculiar contour of the float for effecting the object of this invention, by enabling all speeds to be recorded on the same scale, is determined in a manner fully described in the latter part of the specification noted above.

Holding Down Lids or Covers to their Bearing Surfaces.

SADLER, H. S., and ASHMORE, BENSON, PEASE, AND CO., LIMITED, of Stockton-on-Tees.

No. 6716; March 17, 1911.

This mechanism is applicable to the lids or covers of gas-purifiers or generally where a gas-tight or water-tight joint is required between the lid or cover and its bearing surface.



Sadler and Ashmore, Benson, Pease, and Co.'s Holding-Down Apparatus for Purifier Covers, &c.

The illustration shows a part section through the top of a purifier and its cover, with the holding-down mechanism applied; also a corresponding front elevation.

A is an angle-iron supporting frame to the cover B. C is the top frame of the purifier on which the cover is supported with a strip D, of rubber or other material, forming a gas-tight joint. E is a bracket secured to the frame A and overhanging it, so that a tightening bar F, pivotally secured to it by a pin, hangs over the side of the purifier. G G^1 is a double cam mounted on a shaft journalled in a twin bracket H secured to the frame C of the purifier.

When the cover is lowered on to its seat, the cam and tightening bar occupy the position first shown; the cam being set vertically. In order to tighten-down the cover to its seat, so as to ensure a gas-tight joint, the cam is turned over until the upper part G engages with the hook end of the tightening bar F. "The curvature of the hook and cam end" are said to "so correspond that the mutual fit between them

affords the requisite grip of the cam on the hook, which is retained over a sufficient range of radial movement on the part of both that, as the cam is turned in the direction of the arrow, it retains, as a result of the curvature, its combined grip and pressure on the hook of the tightening bar without risk of dislocation while applying the strain which brings the cover and flange into high pressure contact. The importance of this feature is that a nicety of adjustment of each bar F is not necessary; and, consequently, the provision for this—such as a screw adjustment socket or its equivalent—hitherto applied to each bar is dispensed with." The cam G G^1 is preferably double ended, so that by one operation the cam can be placed in a position suitable for both the raising and lowering of the cover—that is, upon releasing the cam from the high pressure contact with the tightening hook, the cam would be turned round in the opposite direction to the arrow to the vertical position first shown; the part G^1 being in contact with the hook of the tightening bar F. Consequently, when raising or lowering the cover the tightening hook would slide over the outer face of the cam, and obviate any possibility of fouling the flange of the frame C. A slot is provided in the tightening bar to enable the bar to slide up its pivot, and so escape injury should its lower end foul anything as the purifier cover is being lowered into position or placed on the ground. The cams, when set in the "tight-joint" position, can be locked by any suitable device.

APPLICATIONS FOR LETTERS PATENT.

19,633.—Bomhard, K., "Cleaning gases." Sept. 4.
19,781.—Hendunen, A., and Simonenko, A., "Producing gas." Sept. 5.
19,816.—Cowan, W., "Gas-meters." Sept. 6.
19,849.—Anderson, D., "Cocks for gas-turners." Sept. 6.
19,912.—Scott, Duncan, and Co., and Scott, J., "Incandescent gas-lamps." Sept. 7.
19,939.—Parkinson and W. & B. Cowan, Ltd., and Langlands, S. B., "Lighting devices for incandescent gas-lamps." Sept. 7.
19,960.—Jordy, F., and Harting, C., "Generating gas." Sept. 7.
19,964.—Glover, T., "Regulating device for gas-burners." Sept. 7.
19,974.—Van den Driessche, L., "Gas-stoves." Sept. 7.
20,018.—Bagrachow, G., "Metallic incandescent mantles." Sept. 8.
20,024-5.—Cloudsley, J. L., jun., "Internal-combustion engines." Sept. 8.
20,028.—Ostorog, S. J., "Distance gas lighting." Sept. 8.
20,142.—Brown, J., "Gas-turbine." Sept. 11.
20,144.—Reynolds, A., "Regenerative furnaces." Sept. 11.
20,193.—Baynes, F. W., and Malcomess, C. H., "Extracting tar and other impurities from gases." Sept. 12.
20,269.—Lehmann, A., "Bunsen burners." Sept. 12.
20,308.—Bradnock, J., J. J., & S. H., "Gas-heated geysers, boilers, and the like." Sept. 13.
20,324.—Cloudsley, J. L., jun., "Internal-combustion engines." Sept. 13.
20,368.—Jackson, T., and Ramsay, A., "Gas flash-signs." Sept. 14.
20,402.—Tellier, E., and the Compagnie Anon. des Allumeurs Extincteurs du Gaz à Distance, Système Gotè., "Electro-magnetic valves for gas apparatus." Sept. 14.
20,514.—Pickering, W. S., "Combined tar-tower and retort-house governor." Sept. 16.
20,538.—Fletcher, Russell, and Co., Ltd., and Fletcher, T. W., "Enabling coal-fire grates to be utilized for gas." Sept. 16.
20,558.—Dobson, E., "Gas-controllers operated from a distance." Sept. 16.
20,559.—Dobson, E., "Gas-pressure regulators." Sept. 16.
20,568.—Beard, G. F. H., and Scott, J. W., "Supporting means for spirally-guided gasholders." Sept. 18.
20,633.—Kerpely, A. von, "Gas-producers." Sept. 18.
20,666.—Cornall, R., "Connecting pipes." Sept. 19.
20,674.—Pickard, W., and Monks, H., "Gas-regulating." Sept 19.
20,692.—Levy, L. A., "Estimating the percentage of a combustible gas in a gaseous mixture." Sept. 19.
20,727.—Soc. Française de Chaleur et Lumière, "Gas-heated radiators." Sept. 19.
20,757.—Carter, S., "Separating and removing liquid impurities from gases." Sept. 20.
20,817.—Atkinson, C. W., "Coin-freed meters." Sept. 20.
20,831.—Hutton, E., "Lighting and extinguishing street-lamps." A communication from J. Brazier and E. Wood. Sept. 20.
20,878.—Berry, J., Glover, W. T., and Meters Limited, "Gas regulating or controlling means." Sept. 21.
20,938.—Hunt, W., "Recovery of ammonia and bye-products in gas-producers." A communication from A. B. Duff. Sept. 22.
20,982.—Astbury, E., "Quenching coke" Sept. 22.
21,057.—Smith, E. W., "Furnaces." Sept. 23.
21,058.—Smith, E. W., "Door or closing device for the lower ends of vertical retorts." Sept. 23.

LEGAL INTELLIGENCE.

ILLEGAL USE AND WASTE OF WATER.

At the Altrincham Sessions on Monday last week, before Mr. J. A. Morris and a Bench of Magistrates, Eli Henry Spence was summoned by the North Cheshire Water Company for using otherwise than for domestic purposes water supplied for these purposes; for fixing, or causing to be fixed, a pipe or apparatus to the service-pipe; and for using the pipe so that the water was likely to be wasted, misused, or unduly consumed.

Mr. A. Keogh, solicitor, represented the Water Company; Mr. Raby, solicitor, appeared for the defendant.

Mr. Keogh said the defendant was a market gardener. On the 2nd ult., Mr. Hunt, the Company's collector, went to the back of the premises and saw a stream of water running from the direction of two tubs, which were placed underneath the scullery window. On going closer he found a tube attached to the tub, and fastened through a hole in the window. The end of the tube was resting on the ground, and the water was flowing from it at full pressure down a channel about 9 inches wide and 4 inches deep. It was running down an incline, and was emptying itself into a kind of pit which was about 22 yards from the scullery. Both tubs were filled with water which belonged to the Company. Mr. Hunt saw a man come with a bucket, which he filled; and he admitted to him that the water was to be used for pigs' food. Defendant kept one horse, a four-wheel and a two-wheel cart, and about 20 pigs. The total amount he should have paid for water was £2 4s., whereas the domestic rate was only 8s. a year. It was difficult to detect cases of this description, and it was important an example should be made. The Company did not wish to be unduly severe; but they thought a penalty should be imposed to deter others.

Evidence having been given in support of these statements,

Mr. *Howarth*, the Assistant-Secretary of the Company, said the defendant expressed the hope to him that a lenient view would be taken of the matter. He was a poor man, and it would almost ruin him if it was brought forward. He and his wife admitted that the water had flowed from the tap to the pit.

This concluded the case for the Company.

Mr. *Spence* was then called, and, in answer to Mr. Raby, said he left home on the 2nd of September at half-past nine in the morning; and three tubs were then standing outside the scullery window. Two were three-parts full with ditch water, and the other, which was leaking, was half full. The water was standing in the tubs to prevent them from falling to pieces, and had been there all the summer. The pit was amply supplied with water by springs from the top garden, which ran into the ditch. He took the place five years ago, and the spring was there then. The ditch was cleared out, and he drew Mr. Howarth's attention to it. At no time had he used the Company's water for filling up the well.

Mrs. *Spence* said she put the tube on the tap for a man to get two buckets of water. She gave it to him through the scullery window, and directed it to go into the tub. The hose fell between the tubs, and a little water flowed out. It had only been on for two minutes; and she denied that she was wasting the Company's water.

Samuel Priestner, a man employed by the defendant, said the ditch had been in existence for years; so that any suggestion that he was making it at the time the Water Company's official came was not true. Only this once was the Company's water used for the pigs.

Mr. Keogh remarked that it was rather funny that the witness should have been caught the first time.

Mr. Raby said defendant used a couple of buckets of water, but he denied altogether the allegation with regard to the making of the channel. He admitted the use of the tube, but said defendant had understood that he had a right to use it. He submitted that there had been no wilful waste. As was alleged, the pipe was put into the tub, and it slipped out. The Company suggested it was placed between the wall and the tub for the purpose of concealment. This was not true.

During the midday adjournment, the Magistrates visited the defendant's premises. On resuming,

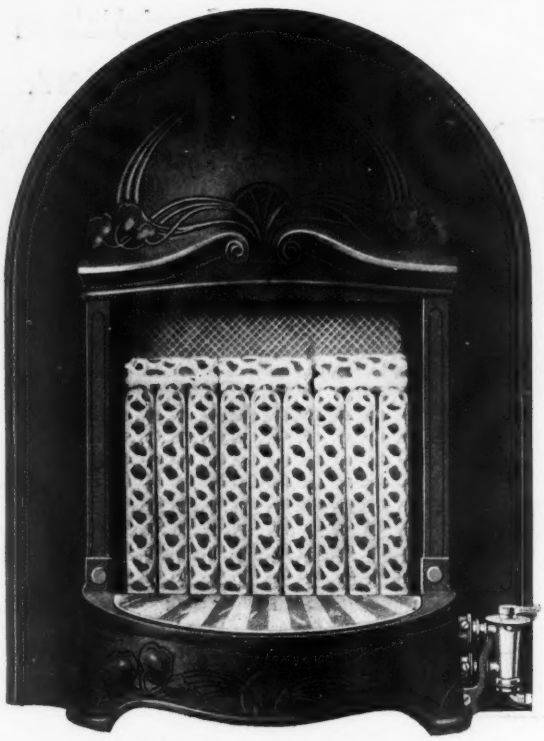
The Chairman said the Bench had considered the case very carefully, and had come to the conclusion that for using water for other than domestic purposes defendant should be fined 21s. and costs; and for fixing the pipe without the consent of the Company, he would be fined 10s. including costs. The summons for allowing the pipe to be used so as to waste the water would be dismissed on the defendant paying 3s. 6d. costs.

The total amount defendant had to pay was £5.

Trade Union Rates in Public Lighting Contracts.

The Works and Stores Committee of the Bethnal Green Borough Council recently reported, with regard to a draft agreement between the Council and the Commercial Gas Company in reference to public lighting, that the Company had declined to enter into it, as they objected to the stipulation providing for the payment and observation of Trade Union rates of wages and hours of labour inserted therein according to a bye-law of the Council. The Company, it was stated, had made alternative proposals, which had been considered by the Committee, who had taken such steps as would make the proposals comply with the bye-law. The Company, however, still declined to approve of the clause, and the negotiations for a scheme of improved public lighting in the Company's area within the borough appeared to be at an end. At the meeting of the Council at which the report was presented, the Chairman of the Committee said the matter was a serious one, and the question of improving the lighting would have to remain in abeyance. Mr. Burton said the Committee had not made the slightest suggestion to meet the difficulty, as they should have done if they had considered the welfare of the people of the borough; and he moved that representatives of the workmen should be asked by the Committee whether they were satisfied with the rates of wages paid. Mr. Barnard said the Committee had no power to recommend the supersession or alteration of the bye-law. Mr. Clark remarked that the bye-law was not one made merely by the Council, but was a standard one for the payment of wages throughout London. In the result, the matter dropped; a hope being expressed that Mr. Burton's proposal would be carefully considered.

Chesterfield Gas Workers' Grievances.—At a meeting of the Chesterfield Gas and Water Board, held last Wednesday, Alderman J. Pearson presiding, it was reported that the Chesterfield branch of the National Union of Gas Workers and General Labourers had forwarded a resolution with reference to the hours of labour, &c., of the workmen in the employ of the Board, and that Mr. J. F. Bell (Consulting Gas Engineer) and Mr. W. T. Buckland (Gas Manager) had been appointed to interview the District Secretary of the Union, and report.



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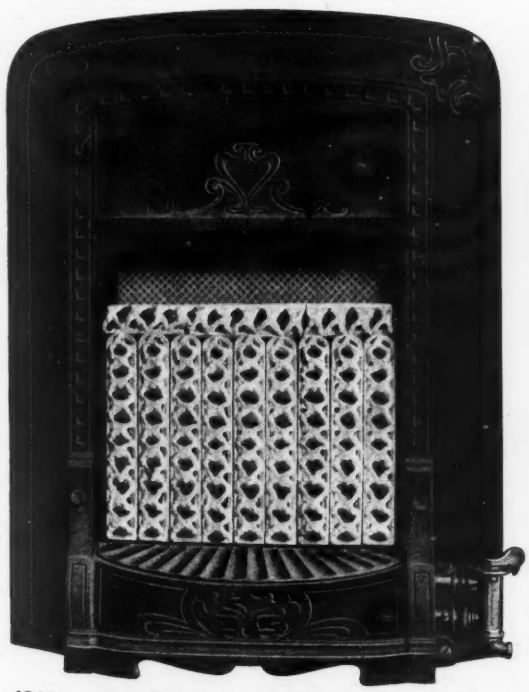
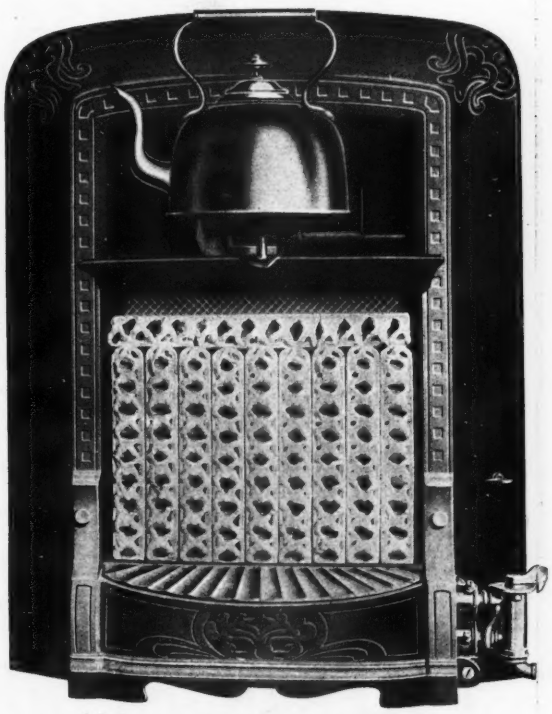


1911 Fire "SAVOY" (Three Sizes.)



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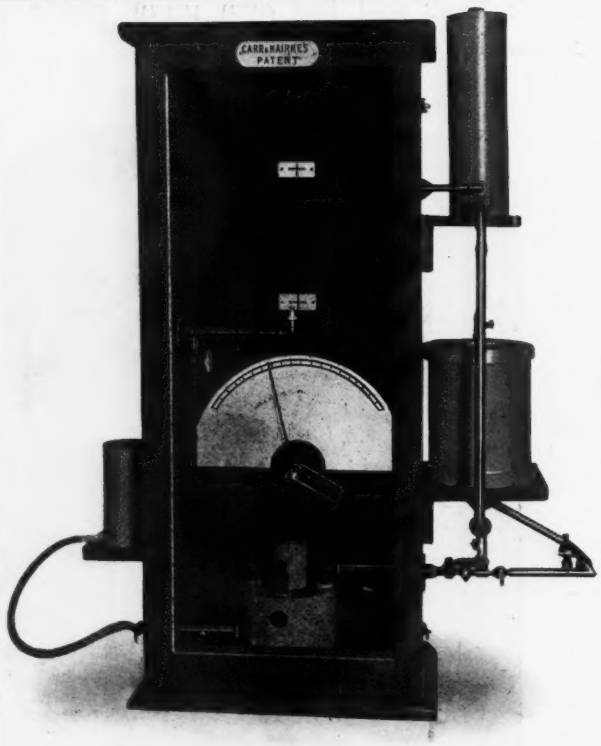

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CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Gas Supply in Napier, New Zealand.

SIR,—In the last "JOURNAL" received (June 27, p. 1026) there is an article on the "Wanganui (N.Z.) Gas Supply," in which the Chairman of the Gas Committee is reported to have made a statement comparing the year's result with my Company, much to the detriment of company and the glorification of borough management.

Whether wittingly or otherwise, the statement, so far as this Company is concerned, was utterly unreliable; and, on reading the article, I wrote to the Borough Council a letter, of which I am forwarding you a copy.

As the statement referred to has been read by the management of every gas concern in the Dominion, I shall be glad if you will give the same publicity to my correction as was given to the original statement.

CHARLES H. EDWARDS, Manager.

Napier (N.Z.) Gas Company, Aug. 17, 1911.

[ENCLOSURE.]

The Town Clerk, Wanganui.

Dear Sir,—In the "JOURNAL OF GAS LIGHTING" (June 27, p. 1026), just to hand, I notice an apparently inspired article on the Wanganui Gas Supply, in which, after detailing the year's work, the following statement is attributed to the Chairman of the Gas Committee (Mr. A. S. Burgess):

> Mr. Burgess concluded by comparing the undertaking under his supervision with that at Napier, which is in the hands of a Company. He said the profit last year at Napier on a capital of £73,785 was £5646, or equal to 7·65 per cent., against £7269 on a capital of £66,000, or 11 per cent., at Wanganui. He thought these figures were instructive, as the two works were nearly similar in size.

I cannot understand how your Chairman could make such a statement, seeing that he was in possession of our balance-sheet; and the veriest tyro in accountancy could have discovered that the item he referred to was profit for the second half of the year only.

For your information, I may state that the profit for the year (as taken from the balance-sheet) was as follows:—

Interim dividend to June 30, 1910	£5,533 17 6
Balance of profit and loss account Dec. 31 . .	7,355 0 8
	£12,888 18 2
Less balance brought forward Dec. 31, 1910. .	1,708 17 7
Net profit for year	£11,180 0 7

as against £7269 for Wanganui. To repeat your Chairman's remark: "These figures are instructive."

We are modest people over our own achievements, and while not at all objecting to your Chairman desiring the full glare of the limelight over his, or even reflecting a little on the gas engineer, we do object, however, to such a misstatement being scattered broadcast through the technical papers associated with the gas industry.

May I express the hope that, now you have the correct statement, your Council will give the same publicity to the correction that the statement of the Chairman of the Gas Committee received.

I am forwarding you a copy of our balance sheet showing the items for your information, and regret the necessity for having to write your Council on the matter.

(Signed) CHAS. H. EDWARDS, Manager.

The High-Pressure Gas Supply at Guadalajara, Mexico.

SIR,—May I be permitted to express my appreciation of the flattering editorial in your issue of Aug. 29, containing a description of the coal-gas plant erected by me at Guadalajara, Mexico.

You say that to instal a high-pressure distribution system was a bold resolution, in view of the fact that the people to be supplied were ignorant of the use of gas, and would not know what to do in case of any slight mishap. I am afraid that the same may be said of those who have used gas for many years; but it is up to the company to take such measures as will reduce to a minimum the probability of the regulator valve-seat "sticking." If the main to be laid for a high-pressure system is properly prepared, there need be no cause for anxiety about accidents because of ignorance on the part of the gas consumer. All regulators are vented to the atmosphere, and should the seal blow, the gas is conveyed out of the house; and if a simple "whistle" device is placed at the end of the vent, the noise made will soon call attention to it. But printed directions as to the form of procedure in the event of the seals blowing, are placed in full view; and the importance of a thorough understanding of the instructions is impressed upon all users of gas.

We may as well make up our minds now that high-pressure gas distribution is the only modern and approved method, assuring as it does a constant and uniform pressure all over the system and, in the case of a large company, an enormous saving in capital charges; also the future growth of cities is fully provided for without having to take up or lay additional mains.

Please correct what is only a typographical error on p. 538 (third paragraph, fourth line): "36 inches long and 8 inches diameter," should read: "36 feet long and 8 feet in diameter.

W. A. ALDRICH.

Grand Rapids, Michigan, Sept. 15, 1911.

Suction-Gas and Town-Gas Plants.

SIR,—I am afraid that many gas engineers reading the leader in your issue of Sept. 19, headed "Suction Gas—Test and Works Conditions," may form an erroneous impression as to the point of view from which I reviewed the present position of suction gas producing plant, in the paper recently presented by me to the British Association.

I feel it necessary to ask your permission to refer to the subject, in order that many friends among the readers of the "JOURNAL" may realize that the paper was written—not to foster competition between suction and town gas (there was no mention of town gas throughout the paper, except in one table where the cost of "town gas to eke out power" was directly alluded to) but to provide material which would enable a discussion to be held upon the relative merits of steam, as represented by the latest type of "locomobile" or semi-stationary engine and boiler combination constructed by Messrs. Garrett (of Leiston) and others, oil, as represented by the Diesel engine, and suction-gas plants, for power users generally throughout the world, and where town gas is not always available.

The majority of your readers, I feel sure, are aware of my views as to the wisdom or otherwise of installing suction-gas plants when town gas is available. I have fully dealt with the topic on many occasions, and particularly in the paper which I presented to the Association of Engineers-in-Charge in March last, at a meeting held under the chairmanship of Mr. Dugald Clerk, and which was reported in your columns at the time. An extract from that paper is appended.

The British Association paper dealt entirely with ascertained working costs, and reported the figures recorded by many actual users. These figures, beyond being collated and arranged for greater ease of reference, were given in my paper exactly as they were received. Your remarks as to my "perfect candour," "frankness," &c., are, therefore, beside the point, as I have no desire—as a consulting engineer, who strives to be impartial—to "advocate" suction plant, but merely to set down what I believe to be reliable facts from which manufacturers may ascertain the average cost of working in everyday practice, instead of, as hitherto, having to rely upon makers' statements and claims based upon "test" results.

Your leader appears to have been written after the perusal of an abstract of my paper. This is unfortunate, and is a little difficult to understand, as a full copy of the paper was posted to you before the paper was delivered. If the full paper had been dealt with, I think it probable that some of the remarks in your leader would have been varied. As you will see from the complete paper, I dealt as fully as possible with cost of fuel, oil, and stores, attendance, maintenance, and repairs; and, where it seemed desirable, I gave figures (resulting from my own experience) which bore upon the different headings, in order to complete the scheme of the paper. From these figures, it was evident that the cost of fuel was but of little moment, as the other items bulked largely in the total cost.

What I wish to convey to your readers is that no imputation as to my "advocacy" of the suction-gas plant over the town-gas engine is warranted from any remarks of mine in the paper to which your leader referred.

W. A. TOOKEY.

212, *Upper Thames Street, E.C., Sept.* 25, 1911.

[ENCLOSURE.]

Extracts from a Paper read before the Association of Engineers-in-Charge, March 8, 1911.

We can also see how much gas power engineers owe to the excellent qualities of the fuel distributed by the various gas undertakings. The complexity of the problems involved in gas-engine construction has been serious enough even with gas available of such uniformity of composition. With an ever-ready supply of gas of uniform quality, the gas-engine maker has been able to improve his machines in a way that would have been impossible unless such fuel had been ready to hand.

Of practically uniform composition and calorific value, being readily available in any quantity at any hour of the day or night, of a richness which enables small pipes to be used for its distribution—there is little doubt that if it were possible to purchase town gas at a price comparable with competing fuels, few users of power in units of moderate size would deem it necessary to instal separate gas-making apparatus, with all that it entails. Even to-day, in many instances it will be found that the advantages are on the side of the town-gas service, when proper consideration has been given to all the questions that arise in connection with power generation in towns, and especially for moderate powers, variable loads, and intermittent operation. It should be remembered in this connection that it is not so much the rated power of the engine that matters as the actual power demanded by the normal factory loads.

But while there is a field for gas-engines served by town gas, there is a much larger one for those that can be fed with gas generated from poor fuels at low costs, and particularly from material that would otherwise be a waste product of manufacture and possibly entail expense for its removal. When gas engines and producers came into world-wide prominence eight or ten years ago—following the introduction of the "suction" type of gas plant—there was no difficulty in demonstrating that a very considerable reduction in cost of power generation could be obtained by the supersession of the steam-engines and old type town-gas engines previously in use, in favour of up-to-date gas-engines and suction-gas plants.

Who are the Gas Companies, and Who the Gas-Stove Firms?

Up to the time of going to press, we have not received from Mr. H. H. Holmes, the Sales Manager of the Borough of St. Marylebone Electric Supply, the justification we asked for last week (p. 815) of the allegations contained in the second and third paragraphs of his letter. There is only one effectual manner in which—in view of the signed and positive denials that we have now in our possession from all the representative gas-stove manufacturing firms of the country—he can substantiate his statements, and that is by publishing the names of the gas companies and the gas-stove makers to whom he referred. If his statements were true, he has nothing to fear from publication. Therefore, we again challenge him to disclose the names, and thus save himself from the judgment that his silence may produce.

We have, since the time of going to press with last week's issue of the "JOURNAL" received replies from the remaining gas-stove makers to whom inquiries were addressed. Here are extracts from their letters:

> We are surprised to receive your letter of Sept. 22. You are quite welcome to use our name, and to state that we have had no communication whatever from any gas company on the subject.
>
> If it is not too late, we may mention that we are not aware of any gas companies who have threatened to withdraw gas-stove orders from manufacturers who supply castings for electric cooking ranges. It certainly has not occurred in connection with our firm.
>
> The third firm also deny the truth, so far as they are concerned, of Mr. Holmes's statements.

MISCELLANEOUS NEWS.

AMSTERDAM CORPORATION GAS UNDERTAKING.

Report for the Year 1910.

We have received, through the courtesy of the General Manager, Heer J. van Rossum du Chattel, a copy of the report and accounts for the past year of the Amsterdam Corporation gas undertaking.

A number of repairs and improvements have been carried out on the plant at the West and East gas-works; and at the East gas-works the carbonizing plant has been extended by a further installation of four settings of Munich carbonizing chambers. The erection of plant at the new South gas-works has been proceeded with. The carbonizing plant will comprise six benches, each containing five settings of eighteen 13-feet Dessau vertical retorts. Further contracts have been placed for the requisite buildings and equipment of these works. The four-lift gasholder has already been brought into use. The administrative offices of the undertaking and the distributing staff are to be accommodated in a new building, which will be ready for use next February.

The production of gas during the year 1910 was 91,769,670 cubic metres (3,240,938,000 cubic feet), of which 72·75 per cent. was coal gas, and the remainder carburetted water gas. The coal carbonized amounted to 224,822 metric tons, of which 42,419 tons were English, and the remainder, with the exception of about 4 tons of Australian cannel, was Westphalian coal. The average make per ton of coal, including carburetting spirit, was 10,655 cubic feet. The water gas made at the East gas-works was carburetted by means of 4235 metric tons of Solar oil; while at the two works, 9129 metric tons of benzol and petroleum spirit were used to carburet the coal and mixed gas.

The production of coal tar has averaged 4·29 per cent. of the weight of coal carbonized. The coal tar has been passed through centrifugal water-separators, and none has been sold containing more than 4 per cent. of water. The production of gas liquor, reckoned as of 1° Baumé strength, has averaged 0·302 per cent. of the weight of coal carbonized. From the liquor, 1977 metric tons of sulphate of ammonia have been produced. Only 8¼ tons of yellow prussiate have been made during the year, as the manufacture was suspended owing to the low prices realizable for it.

The quantity of gas sold was 91,733,070 cubic metres (3,239,645,100 cubic feet), which is 4·9 per cent. more than the quantity sold in 1909. The average illuminating power of the gas sold was 15·29 candles, and the calorific value averaged 563 B.Th.U. per cubic foot. The mean specific gravity was ·447. The total number of ordinary meters in use at the close of the year was 45,532, of which about one-third were wet meters. In addition to the ordinary meters, 64,159 prepayment meters were in use on the 31st of December last, representing an increase of 4291 in the twelve months. The average consumption of gas per meter on the prepayment system has shown an increase from year to year; and in the past year 39·68 per cent. of the total consumption was registered through prepayment meters. The mean consumption of gas per head of the population averaged 5231 cubic feet. The length of mains in the city at the end of the year was about 252 miles, which is an increase of 1·6 per cent. in the twelve months. At the close of the year, there were 9441 lanterns in use for public lighting, all except 20 of which were fitted with Kern burners; 565 of the lanterns having groups of from two to seven burners.

The profit on the year's working was 3,644,043 florins (£303,670), which, after deducting interest and redemption charges, left a net profit of 1,871,041 florins (£155,920), which is slightly higher than that realized in 1909.

BRUSSELS MUNICIPAL GAS SUPPLY.

Report and Accounts for 1910.

The report of the Gas Committee of the Brussels Municipality on the progress of the gas undertaking in the year ended the 31st of December last is given in the current number of the "Journal des Usines à Gaz." It shows that the total quantity of gas sent out was 47,270,170 cubic metres, or rather more than 1668½ million cubic feet, compared with 46,289,450 cubic metres, or about 1634¼ million cubic feet in 1909. The total output for the past year was divided as follows:—

	Cubic Metres.
Lighting	29,967,630
Heating	7,073,658
Motive power	2,293,194
Municipal establishments and benevolent institutions	1,605,858
Dwelling-houses on the works	23,832
Illuminations and balloons	53,847
Various purposes	178,029
Total gas sold	41,196,048
Public lighting and illuminations	3,772,202
Works and offices	1,381,950
Unaccounted for	919,970
Total	47,270,170

The quantity of coal carbonized was 110,253 metric tons; and 4605 tons of oil were used for enrichment. The sale of coke was regular during the year; and the stock at the close was not large. The market for cyanides left much to be desired. The breeze was utilized partly for the manufacture of compressed fuel by means of pitch resulting from the distillation of tar. This fuel is used on the works for the heating of boilers and generator furnaces. All the ash produced on the works is sold for making mortar and for repairing roads. During the year, 365 prepayment meters were fixed; bringing up to 6231 the number of these meters in use. The average consumption of gas per meter was 12,714 cubic feet. At the close of the year there were in use 46,142 meters, 6907 rising pipes for the supply of flats, 17,015 interior installations, and 29,093 heating appliances; the figures for the preceding year being 45,125 meters, 6775 rising pipes, 16,764 interior installations, and 28,392 heating appliances. On Dec. 31 last, there were 7128 public lamps, in which there were 6871 upright and 2507 inverted incandescent burners.

The total revenue last year was 7,383,649 frs.; and the expenditure, 4,765,308 frs.—showing a difference of 2,618,341 frs. (£104,734) in favour of the Municipality. There was, however, a decrease of 131,346 frs. (£5254) in the value of the stores; so that the above-named figure was brought down to 2,486,998 frs. (£99,480). The expenditure on capital account during the year amounted to 370,470 frs. (£14,819); bringing up the total to 34,120,992 frs. (£1,364,840).

Reference is made in the report to the special pavilion which the Belgian Association of Gas Managers erected in the grounds of the exhibition, and in which, as already recorded in the "JOURNAL," there was shown a very fine collection of appliances for the utilization of gas for the production of light, heat, and power. The undertaking was in every way successful. The Gas Committee contributed 5000 frs. to the fund raised for defraying the expenses of the pavilion, and placed at the disposal of the organizers models of bakers' and pastrycooks' ovens, constructed at the gas-works, and in use for several years for baking bread in the employees' quarters. The Committee were entrusted with the lighting of a portion of the gardens of the exhibition; and, in response to an appeal made to Belgian and foreign manufacturers, a number of interesting appliances were placed at their disposal. Thanks to this valuable assistance, the Committee say they have every reason to congratulate themselves upon the results obtained.

BRITISH GASLIGHT COMPANY, LIMITED.

The Half-Yearly General Meeting of this Company was held last Wednesday at the London Offices, No. 11, George Yard, E.C.—Mr. J. HORSLEY PALMER in the chair.

The SECRETARY (Mr. A. W. Brookes) read the notice convening the meeting, as well as the following report of the Directors:

The Directors submit the half-yearly accounts of the Company to the 30th of June last, as examined and certified by the Auditors, who have also vouched for the correctness of the several investments held by the Company.

The available profit is £31,982, after deducting the following sums (omitting shillings and pence): Income-tax, £2435; Hull debenture interest, £2118; Norwich debenture interest, £1779; Potteries debenture interest, £659; Trowbridge debenture interest, £164; and interest on debenture stock, £2260—£9418.

HULL.—The gas-rental shows a decrease of £1120, as compared with that of the corresponding period of 1910, the price of gas having been 1s. 10d. per 1000 cubic feet, as against 2s. per 1000 cubic feet. Coke shows an increase of £2324; tar and tar distilling, of £387; and ammoniacal liquor and sulphate of ammonia, of £925. Coals have cost 13s. 2d. per ton, as against 12s. 11d. per ton. Coke has realized 11s. 7d. per ton, as against 10s. 3d. The gas sold shows an increase of 37,143,648 cubic feet, which is equal to 5·84 per cent. The quantity supplied in bulk to the Corporation for the supply of the old town was 42,217,000 cubic feet, being 909,000 cubic feet less than the quantity supplied in the same period of 1910. The profit realized, after writing off £934, part cost of extension of Baker Street office and workshops, is £244 in excess of the parliamentary interest. This sum has been invested; making the reserve fund £45,998.

NORWICH.—The gas-rental shows an increase of £39, as compared with that of the corresponding period of 1910; the price of gas having been reduced from 3s. to 2s. 10d. per 1000 cubic feet from April 1, 1911. Coke shows an increase of £1464; and tar and ammoniacal liquor, of £574. Coals have cost 16s. 7d. per ton, against 15s. 11d. Coke has realized 14s. 11d. per ton, being the same price as for the corresponding period of 1910. The gas sold shows an increase of 7,311,800 cubic feet, which is equal to 2·84 per cent. The profit realized, after writing a second sum of £1000 off the cost of the relief holder at Palace station, is £2404 in excess of the parliamentary interest.

POTTERIES.—The gas-rental shows an increase of £1062, as compared with that of the corresponding period of 1910; the price of gas having been the same—viz., 2s. 6d. per 1000 cubic feet, with special rebates to large consumers. Coke shows an increase of £436; tar, of £331; and ammoniacal liquor and sulphate of ammonia, of £223. Coals have cost 10s. 6d. per ton; being the same price as for the corresponding period of 1910. Coke has realized 8s. 7¾d. per ton, as against 8s. 6¼d. per ton. The gas sold shows an increase of 9,261,941 cubic feet, which is equal to 4·94 per cent. The profit realized, after writing off the sum of £2972 on account of old gasholders now demolished, is £7440, which is the amount of the authorized parliamentary interest. The balance to the credit of the reserve fund account is £1257.

TROWBRIDGE.—The gas-rental shows a net increase of £232, as compared with that of the corresponding period of 1910; the price of gas having been the same—viz., 3s. per 1000 cubic feet, with discounts. Residual products show an increase of £292. Coals have cost 15s. 11d. per ton, against 16s. 3d. Coke has realized 12s. 9d., against 11s. 8d. per ton. The gas sold shows an increase of 1,604,830 cubic feet, which is equal to 4·91 per cent. The profit realized is £84 less than the parliamentary interest.

HOLYWELL.—The gas-rental shows a net increase of £21; and residual products, of £20. The profit realized is £320.

PROFIT AND DIVIDEND.—The available profit, added to the previous balance of profit and loss, amounts to £99,684. From this sum, the Directors recommend a dividend at the rate of 10 per cent. per annum, with a bonus of 5s. per share, both less income-tax. The dividend and bonus, less tax, will amount to £28,838, and leave a balance of £70,845 19s. 2d.

DIRECTORS AND AUDITORS.—The Directors who go out of office are Mr. J. Horsley Palmer and Mr. Frederick Wilkin; and the Auditors are Mr. E. Knowles Corrie and Mr. William Cash, F.C.A. They respectively offer themselves for re-election.

EXTENSIONS AT HULL—ADOPTION OF THE WOODALL-DUCKHAM CONTINUOUS CARBONIZING SYSTEM.

The CHAIRMAN, in moving the adoption of the report and accounts, said he should not, on this occasion, keep the shareholders very long, because there was very little interesting detail to give them. The report had informed them fully of the satisfactory progress the Company had made. The increase was an advance on the increase reported

six months ago; and the workings throughout had been thoroughly satisfactory. To deal with Hull first. The shareholders who were present at the last meeting would remember that he pointed to the fact that they were about to increase the size of the works there, owing to the natural increase of the business, and that during the six months which were now under consideration the Directors would devote their attention to the plans for a new retort-house, purifiers, and so on. This was the principal work the Board had had in hand during the past half year. The extension of the works would necessitate the erection of a very large retort-house, and a corresponding amount of plant in the shape of purifiers, condensers, washers, as well as additions to the carburetted water-gas plant. In this connection, the Board thought it well to send their Manager at Hull to various stations in this country where the newest systems of vertical retorts had been erected, because they wished not only to have his opinion upon the subject, but to test the best vertical system that they thought could be put up at Hull. After considerable examination on the part of Mr. Young (who is an exceedingly competent engineer), he decided to recommend the Board to adopt what was known as the Woodall-Duckham vertical retort-settings, and this would be the system they proposed to erect on the vacant piece of land which in years gone by, had had a retort-house upon it, and which had been cleared for the purpose of the new retort-house. He (the Chairman) paid a visit to Hull about three weeks ago; and while there examined the site, and also saw the work which had been done to the foundations for the new purifiers, which were now in course of erection, as well as for the other plant which was now also on order. So that, before this time next year, they hoped to have installed a complete system of vertical retorts; and the total cost, the Board expected, would be for the whole extension—carbonizing plant, purifiers, condensers, and everything—about £40,000. This installation would be completely distinct from the other parts of the works, so that they would be able to test the capacity of the vertical system to the very last degree; and this would be of great interest not only to the Board, but to shareholders as well.

PRICE REDUCTION AND BUSINESS GAIN.

It would have been noticed in the report that Hull showed a decrease in gas-rental of £1120; and he should like to make a few remarks upon this figure. The price of gas at Hull during the half year under consideration was 1s. 10d., as compared with 2s. in the half year to June 30, 1910. If there had been no increase in the business, they would have shown a decrease in rental of £4640; so that it would be seen that, with a decrease in rental of only £1120, they had already picked up in the six months £3520. This clearly showed the good policy of keeping the price of gas down as low as possible, because they had sold a very largely increased quantity of gas. He might say their business at Hull was in a most satisfactorily progressive condition; and he sincerely hoped that they might before very long come down to the price which they had there for a short period some years ago. He believed that it was not long after he joined the Board that the price at Hull was 1s. 9d. per 1000 cubic feet. He could not definitely promise this further reduction to the people of Hull at the present moment; but it was his great desire that before long they might be in a position to charge this price again.

A FIRE AND FUTURE PRECAUTIONS.

One day he picked up one of the halfpenny illustrated morning papers which made a great boom of various things; and to his surprise he saw a view of what appeared to be the British Gaslight Company's works at Hull blazing tremendously. It turned out that it was their next door neighbour's works that were on fire; but the photographer had apparently taken as his principal view the Gas Company's works. A certain amount of damage did occur to their works; but it was entirely covered by insurance. It was a varnish makers' works that were alight; but the fire burnt down part of the Company's stables and joiners' shops. When he (the Chairman) recently visited the works the damaged buildings had nearly been restored to their normal condition. The Directors had made arrangements with the varnish company not to again deposit their stores of varnish near the boundary of the gas-works, but at the extreme end of the varnish company's property. He therefore hoped that they would not have any trouble of the sort in the future.

THE BUSINESS POSITION AND A REDUCTION AT NORWICH.

There was really nothing to say on this occasion regarding the business at Norwich. It had been progressing very satisfactorily. He dealt very largely six months ago with what they had done there in the way of erecting a new gasholder, and purchasing property contiguous to their works; and since then they had had six months complete quietude at Norwich. Business, however, had gone on in a gratifying manner. The price of gas had been reduced from 3s. to 2s. 10d. But the reduction only applied to the second quarter; so that they had not felt its full effect. As the report showed, notwithstanding the reduction of 2d. on the June quarter, the increase in the gas-rental over the half year was £39. This again was satisfactory, as showing that the Company were making progress in Norwich as at the other stations.

POTTERIES EXTENSIONS—A GOOD PRICE CONCESSION.

At the Potteries, as he mentioned at the last meeting, they had been extending their system of mains to outside districts by the special request of the various communities, and with the full sanction of the local authorities. They had also made satisfactory arrangements to further extend the mains to places called Bucknall and Townsend, where the Company had been asked to put up eighty public lamps, and had already the promise of a good number of private consumers. The surplus profit at this station had been written off the old gasholder account; and they had now only £4820 left to be written off. Since the close of the accounts for the half year, the Manager of the Potteries station had been before the Board with an urgent message from the consumers, asking if the Company could not make a further reduction in the price of gas at the Potteries. After going carefully into the matter, the Directors had decided that they should make the venture. It would bring them up rather close to what they were entitled to as their parliamentary interest, but the Board felt it was a step in the right direction. Gas was very cheap in the neighbourhood now; and therefore the Board proposed to make the substantial reduction from 2s. 6d. to 2s. 3d., with corresponding reductions to large consumers. But this was a matter of interest for the future, seeing that it really did not come into the business of the period now under consideration.

EXTREME TROUBLES.

These were the principal things he had to speak about that day. Looking at matters generally, while he did not wish to alarm gas shareholders in any way, he could not help feeling that, in these days of great labour unrest, they never knew when they were going to be hit. The Company were on good terms with their workpeople. The Board were always ready to meet them; and, he was glad to say, the men were always willing to come to them. They had always been on a friendly footing both in regard to their rates of pay, holidays, and all the substantial advantages the men enjoyed. But when it came to strikes of railwaymen which prevented them obtaining their supplies of coal, and to strikes in various other directions in which they were really not interested at all, then difficulty came in in connection with the future of gas making. He sincerely trusted that, during this next winter, there would not be any more upheavals such as there had been during the last few months, when the Company were inconvenienced in many ways, more especially through the great North-Eastern strike. At the time he paid his visit to Hull, he landed at Grimsby (after a short holiday in the East); and he believed that this was the very first day—luckily for him—that there was proper railway connection between Grimsby and Hull.

Mr. CORBET WOODALL seconded the motion.

Mr. W. STEVENS asked how it was proposed to raise the money required at Hull.

The CHAIRMAN replied that there were two ways of doing it. They could either issue more shares (of which they had plenty to issue) or they could issue a further amount of debentures. This probably would be the cheaper form of doing it. The Board, however, had not really considered this matter, because they had not yet had to pay out large sums under the contract. He did not think they would require to raise any money just at present; but he had no doubt that, towards the completion of the work, they would have to raise some.

The motion was unanimously adopted.

Proposed by the CHAIRMAN, and seconded by Mr. FREDERICK WILKIN, a dividend of 20s. per share was declared, with a bonus of 5s. per share, for the half year, both less income-tax.

On the proposition of Mr. WOODALL, seconded by Mr. LEONARD R. WILKINSON, a resolution was cordially passed returning the Chairman (who retired by rotation) to his seat at the Board.

Moved by Major-General W. T. CORRIE, and seconded by Mr. R. S. GARDINER, Mr. Frederick Wilkin was also re-elected.

Proposed by Mr. KENNETH R. MACKAY, and seconded by Mr. STEVENS, Mr. E. Knowles Corrie was reappointed an Auditor; and, moved by Mr. BERNARD F. HARRIS, and seconded by Mr. STEVENS, Mr. William Cash, F.C.A., was also reappointed.

A hearty vote of thanks was next passed to the Chairman and Directors, on the proposition of Mr. STEVENS, seconded by Mr. KENNETH R. MACKAY.

The CHAIRMAN, in reply, thanked the proprietors for their appreciation and expression of confidence. The members of the Board, he remarked, were in the same boat with the shareholders. They were all largely interested in the concern, as were also their relatives and friends. The Company was thought a great deal of in quarters where it was least expected. He knew, for instance, of a very good charitable institution which invested its money in the Company's debentures and debenture stock; and this gave some idea of the way the Company were regarded by the general public. It was only natural, therefore, that the Chairman and Directors should use their utmost endeavours to keep up the reputation of the undertaking to the utmost of their ability, and by conducting the business on proper and economical lines. But there were the Secretary and officers of the Company. It had been truly said over and over again that the Board would be almost useless if they had not a really first-class staff. This was a fact. His experience in going round to the stations and at the London office was that they had a very valuable staff, without which the prosperity of the Company could not be what it was. He proposed that the thanks of the shareholders be given to the Secretary, the Managers at the stations, and the staff generally.

Mr. KENNETH R. MACKAY seconded the motion, which was heartily passed.

The SECRETARY replied on behalf of himself, the Managers at the stations, and the staff. He remarked that it was very encouraging to receive the commendation of the Chairman and Directors; and the officers all felt they were indebted to the Board for the kind consideration they always had for them and the staff generally. The endorsement of the Chairman's remarks by the shareholders would give additional gratification.

Southborough Public Lighting.—The Southborough Urban District Council Gas and Water Committee have had before them a letter from the Tunbridge Wells Gas Company stating that they were prepared to convert the whole of the flat-flame lamps in the High Brooms district to the incandescent system at their own expense, and to light and maintain the 33 incandescent lamps at a charge of £2 17s. 6d. per lamp per annum. The Council adopted a recommendation of the Committee that this offer should be accepted.

Bexhill Water and Gas Company.—Mr. A. Kersey, presiding at the meeting of the Bexhill Water and Gas Company last Thursday, said the Directors' report for the past six months was a satisfactory one. Comparing the figures with those of the corresponding half of last year, there had been an increase of £211 in the revenue from water; but there had also been an increase of £109 in the expenses for water management, due principally to repairs. The revenue from gas showed an advance of £393; and the expenditure was higher by £196. The total increase in revenue amounted to £613, which was very good; showing, as it did, decided growth in the Company's business. The report was adopted.

GAS AND COMMERCIAL SECURITIES CORPORATION, LIMITED.

Ten-and-a-Half Per Cent. in the First Two Years' Operations.

The Ordinary General Meeting of the Shareholders in this Company was held last Wednesday, at the Offices, 39, Lombard Street, London, E.C.—Mr. R. S. GARDINER in the chair.

The SECRETARY (Mr. W. Foreman) read the notice of meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN, in moving their adoption, said it was highly gratifying to the Directors to be able to submit such a satisfactory summary of their operations during the past year as that which was now presented to the shareholders. The earnings allowed them to write off the balance of the formation expenses, to distribute to the shareholders a return of 5½ per cent. for the year, free of income-tax, and to add about £100 to the undivided profit carried forward. After charging all costs of management, office rent, and clerical expenses, a net profit of £1612 11s. 6d. had been earned. After deducting interest on debenture stock, there remained an amount available of £1125 6s. 9d., irrespective of the undivided profit brought forward from last year. They had, in the first instance, written off the balance of the formation expenses, which, he might remind the shareholders, included the whole registration fees payable on a capital of £100,000. They distributed in April last an interim dividend of 2½ per cent.; and the Board now proposed to pay a final dividend of 3 per cent., free of income-tax—carrying forward £481 16s. 11d., as compared with the carry-forward of £377 15s. 2d. last year. The share capital had increased since the last meeting from £10,000 to £16,210; and the debenture stock from £10,000 to £14,750. Therefore, the total amount of the share and debenture capital had increased by £10,960, and now amounted to £30,960, against which they held investments standing in the books at £30,718 2s. 10d., and worth considerably more, besides which on Aug. 31 they had in cash at the bank £1347 14s. 5d. The total indebtedness to creditors was only £137 14s. 4d.; and this included provision for accrued interest on the debenture stock, income-tax, audit fees, &c. He had gone very carefully, together with the Auditors, into every single security the Company held; and it was with the utmost satisfaction that he was enabled to state that the Auditors agreed with him that there was no occasion to write-down any one of the securities, and that their aggregate immediate cash-selling value exceeded, by several hundreds of pounds, the ledger value. The shareholders must agree with him that this was highly satisfactory, and most creditable to the Directors, especially in times like this when securities almost universally showed considerable depreciation, and when so many other concerns had had to provide for a serious shrinkage in the value of their invested resources. Seldom was it that, at the close of a second year's operations, a company were in the happy position of having liquid assets exceeding the value of the whole of the share and debenture capital, with the whole of the formation expenses written off, and after paying dividends to the shareholders equal to 10½ per cent. in the two years, on the share capital, free of income-tax. The Company's operations during the past two years had therefore amply justified its existence; and he had the utmost confidence in its continued and progressive prosperity. Its position being so thoroughly sound, he might venture on this occasion to deal with some of the objections he had heard made to it. The first one was as to the title, which was considered long, ill-sounding, and cumbersome. When the Company started two years ago, a number of names were submitted; but the Directors were advised that none of them could be registered, owing to their similarity to those of existing Trust Companies. Considerable delay took place; and it looked as if they would have been compelled to postpone the formation of the Company until after the summer holidays. To avoid this, and finding the Registrar would accept the present title, and as the Board thought it correctly described the future operations of the Company, they registered under it. He quite agreed with what had been said against the title. It was one they did not adopt of their own choice; but it was accepted from dire necessity. There was another serious objection to the title—that was, that it closely resembled the names of other companies whose operations had not been altogether crowned with success, and whose methods and principles were diametrically opposed to their own. For this reason they had considered, and were still considering, the question of changing the title. It was an easy matter, if they could find a name that commended itself to the Registrar. If any shareholder cared to exercise his or her ingenuity in sending in suggestions, and if any title commended itself to the Board and to the Registrar, he should be very pleased to present that shareholder with a memento of his or her resourcefulness. He frankly admitted, however, that he was rather superstitious himself, and that he should hesitate before giving up the name under which the Company had, up to the present, been so signally successful. The second objection that had been raised to the Company was that it was such a small one. It must be taken into consideration that the prospectus was never advertised, that it was circulated privately, and that the £20,000 with which they started two years ago was raised without any expenses whatever. When he met the shareholders a year ago, the share capital was £10,000; and the debenture stock stood at a like amount. During the year they had issued over £10,960, which had likewise been raised without any expense to the Company. This represented an increase in the twelve months of a little more than 50 per cent., which was surely a satisfactory and encouraging ratio of progress. He thought that one of the reasons for their success might be that, owing to the small amount at their disposal, the Directors had exercised a degree of care and prudence in the selection of the investments which perhaps they might have felt less occasion to do if they had had larger sums to deal with. The two years during which they had accumulated their present investments had given them additional knowledge and experience; and he thought that, on the whole, it had been to the advantage of the Company that the beginnings had been on a small scale. He knew of one Trust Company that had a capital of £30,000 five years ago; to-day, its capital stood at £200,000. That was the amount at which they themselves should aim; and he hoped the shareholders would assist the Board in reaching it. Some of the shareholders had doubled their original holdings, which had been very gratifying to the Board; but they would still more appreciate the shareholders making the Company known among their friends. There must be many who would be very glad to learn of a security which was not dependent on the prosperity of any one industry, or upon the condition of any one country, but which had divided interests spread all over the world. The Directors were prepared to issue such an amount of share capital and of debenture stock as would bring up the total to £50,000; and when they had reached this figure, they intended to apply for a Stock Exchange quotation.

Mr. L. C. FAREBROTHER seconded the motion, which was unanimously adopted.

Proposed by the CHAIRMAN, and seconded by Mr. FAREBROTHER, a final dividend of 3 per cent., free of income-tax, was declared.

On the motion of the CHAIRMAN, seconded by Mr. HARGROVE, Mr. Farebrother was re-elected to his seat at the Board.

Moved by Mr. C. B. O. CLARKE, and seconded by Mr. BERNARD F. HARRIS, the Auditors (Messrs. Monkhouse, Goddard, and Co.) were re-elected. In connection with this re-appointment, the CHAIRMAN remarked that it was obviously essential to the well-being of a Company like theirs that the accounts should be examined, and the securities checked, by a firm of professional accountants of the highest standing. He thought they were fortunate in having engaged Messrs. Monkhouse, Goddard, and Co., who looked into their affairs with the greatest minuteness.

A vote of thanks was passed to the Chairman and Directors, on the motion of Mr. CLARKE, seconded by Mr. HARRIS, both gentlemen referring to the satisfactory and excellent results the Board had achieved.

GAS-FIRED FURNACES IN SHEFFIELD.

How Cheap Gas Helps the Manufacturer.

[From the "Ironmonger," Sept. 30.]

An interesting development of the application of gas-heating to mechanical processes of which little is known generally may be found n the handicraft and other staple trades of Sheffield, where a compact and cleanly gas-fired furnace is gradually ousting from the workshops of these trades the old-time coke-fired hearth and the more modern coal-fired oven furnace for heating, hardening, and tempering cutlery and steel tools of many kinds. The fact that more than 400 of such furnaces are at work to-day in Sheffield, most of them having been installed during the last three years, and that the number is constantly being added to, shows the innovation is making good progress.

Credit is due to the Sheffield Gas Company for the educational work they have done in making known to the local manufacturers the possibilities and advantages of gas heating for the purposes of their various industries. The officials of the Company at an early stage thoroughly studied the subject, and, by placing the results of their experience and investigations at the service of the trade, enabled the latter to utilize the new agent with the least possible expense, responsibility, and loss from preliminary or futile experiment. Users have been able to witness practical demonstrations of gas-furnaces for a variety of purposes on the Company's premises, and to be assured of their efficiency, before deciding to instal them in their works. Moreover, the officials are in a position to offer valuable advice upon all kinds of requirements. Recognizing the possibilities of the development of gas heating in mechanical processes as a source of revenue, the Company have organized and equipped a special department, under the direction of Mr. Arthur Mead, the Fittings Superintendent; and a large new showroom, where a great variety of furnaces will be seen at work, is now approaching completion.

The chief recommendation of gas-fired furnaces is that they ensure uniform heat, and are consequently valuable for all processes requiring temperatures well under control. It is also held that they are cleanly in working, occupy little space, and are much lower in fuel cost than when coal or coke is used. The variety of purposes for which the furnaces are being used is somewhat remarkable; and these are extending as the result of experiment. The principal manufacturing silversmiths employ them for annealing silver and German silver, moulding Britannia metal, and melting German silver. In the steel trade, their purposes include forging, hardening, and tempering of edge tools, machine knives, table blades, files, high-speed drills and tools, wire, and small crank-shafts; also for heating railway springs for punching and fishplates for bending, drying cores for foundry work, &c.

A still more important field for gas-heating has been found in furnaces for annealing high speed or carbon crucible steel. For this purpose a large furnace, 16 feet long, has been installed in Sheffield, which is giving excellent results, and not only saves working expenses but gets rid of the considerable emission of black smoke which cannot be avoided when such processes are coal-fired, as a smothered flame must be maintained throughout. The gas consumption of the furnace referred to is only 2000 cubic feet per hour. For heating the baths of lead and salts in which some classes of steel are now hardened, gas-furnaces may be obtained of which the efficiency has been fully established. An apparatus of this kind in the Company's show-room heats various mixtures of salts in crystalline form to any temperature up to 1000° C. The pressure from the Company's mains suffices for all the processes mentioned above; but the furnaces may be fitted with air-blast apparatus for producing higher temperatures. The consumption of gas per furnace in Sheffield ranges from 20 to 5000 cubic feet per hour. Several noted firms who were pioneers in gas cooking have lately given attention to the production of furnaces suitable for almost every conceivable requirement of the metal trades.

An important factor in the development of gas-heating in the Sheffield trades has been the cheapness of the local supply of that commodity. For industrial purposes, the manufacturers can, in fact, command the cheapest gas in the country. For engines, the price is only 11d. per 1000 cubic feet, and for other purposes 1s. 3d., with a reduction to 1s. 1d. if the annual consumption exceeds half-a-million cubic feet. Any consumption exceeding the latter total is charged at 11d.

NEW GAS-WORKS AT ST. BLAZEY.

A number of persons interested in gas-works in Cornwall met at St. Blazey last Thursday, to inaugurate the new works erected for the St. Blazey Gas Company, Limited. The old works were built by a firm of engineers and founders established in the district, and after about 50 years' service were sold by auction in 1892. Mr. F. J. Nettle became the purchaser, and formed a Company, of which he was appointed Secretary. The old plant underwent repair; but it was not possible to greatly increase the output. When, therefore, a year or two ago the Great Western Railway Company applied for a supply of gas for their locomotive and carriage sheds, the Directors of the Gas Company consulted Mr. H. E. Riley, the Engineer and Manager of the St. Austell Gas Company, who advised the erection of new works. Acting upon this advice, the Directors obtained a suitable site on a lease for 250 years, and took the necessary steps for raising the capital required; the sum of £3600 being readily subscribed in the locality. The contract for the plant and machinery was let to Messrs. Willey and Co., of Exeter; and that for the buildings, to Mr. J. Alderman, of Par. The whole works were erected and equipped in nine months from the date of the signing of the contract. They comprise retort-house and coal-store, each 42 feet long and 30 feet wide; the height to the eaves being 16 feet. The coal-store has a capacity of 400 tons. A condenser of the vertical type has been erected; and there is a gasholder, 40 feet in diameter and 16 feet in depth, erected in a steel tank built on a concrete base on the ground level. The engine, exhauster, meter, and governor are all under one roof. In addition to the manufacturing plant, about 400 yards of new mains have been laid. The works are built in close proximity to the docks at Par, and are bounded on two sides by the sea. Owing to the facility with which coal can be discharged, a saving of 8d. per ton will be effected as compared with the price formerly paid for carting. It is estimated that the Railway Company will need 1,000,000 cubic feet per annum.

At the opening ceremony, Mrs. Knight turned the gas into the new holder; and Mr. Riley, on behalf of the Contractors, presented her with a silver salver as a memento of the occasion. Tea was subsequently served, and speeches of congratulation were made by Mr. S. J. Ingram, Engineer and Manager of the Truro Gas Company, Mr. Reid, representing Messrs. Willey and Co., and other gentlemen. The Chairman of the Company complimented Mr. Riley and the Contractors on the rapidity with which the work had been carried out—which was really two months under the contract time—and the success which had attended its inauguration.

MANCHESTER PUBLIC LIGHTING.

Gas and Electricity Tests in Central Thoroughfares.

In the early part of the present year, the Manchester City Council decided that there should be a test made as to the respective merits of gas and electricity for street lighting purposes; the understanding being that the Gas Department, which had already inaugurated a system of high-pressure gas lighting in Piccadilly, should undertake the illumination of Mosley Street and St. Peter's Square, and the Electricity Committee that of Portland Street and Albert Square, so that comparisons might be made between the two systems. By the end of July, the Gas Department had extended the high-pressure installation to the streets allocated to them; and last week the Electricity Committee inaugurated their improved lighting of Portland Street and Albert Square. The new electric lamps were first brought into use on Monday evening, when an inspection was made by members of the Electricity Committee, accompanied by Mr. S. L. Pierce, the Chief Electrical Engineer. At its conclusion, Mr. G. Howarth, the Chairman of the Committee, stated that from the preliminary tests made the members were of opinion that a high standard of illumination had been reached; but, in view of the fact that any figures ascertained or published by them dealing with the degree of illumination obtained, and the costs, might be deemed by some people as biased, they proposed to have an independent test made by an expert unconnected with the department. The following are details of the two installations.

High-Pressure Gas.

The 32 lamps fixed in Mosley Street and St. Peter's Square, like those on the Piccadilly site, are of the globular type, with one inverted burner. They are fitted with a nipple to pass 25 cubic feet of gas (London) per hour, giving a light of 1500 candles. The lamps are mostly suspended in harp-shaped pendants fixed on the top of the cast-iron columns; and the height from the pavement to the mantle in the lamp is 15 ft. 6 in., compared with 14 feet in the case of those on Piccadilly. On the "island" in St. Peter's Square, the lamps are suspended from swan-neck brackets attached to the tramway span-wire poles; and the height to the mantle in these lamps is 16 ft. 6 in. At midnight the high-pressure lamps are extinguished, and a one-burner Graetzin type low-pressure inverted lamp lighted. These are attached by a swan-neck bracket to the same column or tramway-pole as the high-pressure lamps. The latter lamps are lighted by an acetylene torch, which is inserted through the orifice in the bottom of the glass bowl. This secures a saving of 10s. per lamp per annum, which represents the cost of gas if the lighting were done with a bye-pass. The low-pressure lamps consume 5 cubic feet of gas per hour, including bye-pass, and give a light equal to about 100 candles. They are lighted from a bye-pass consuming about one-fifth of a cubic foot of gas per hour.

The compressor-house is situated under the esplanade at the George Street end of Piccadilly. In it is fixed a Keith-Blackman "E" size rotary compressor (in duplicate), chain driven from a 4-H.P. electric motor, all on one base. It is capable of compressing 10,000 cubic feet of gas per hour, which is sufficient to supply 400 lamps of 1500-candle power. The gas is compressed to 54 inches water pressure. The distributing mains are of cast iron, with turned and bored joints filled with cement, and are 6 inches and 4 inches in diameter. It is proposed, in any further extensions, to employ Mannesmann steel tubes. On the Piccadilly site there are 24 lamps of 1500-candle power; making 56 in all now in use for street-lighting purposes.

Electric Lighting Installation.

As to Albert Square, 16 of the 10-ampere "Metro-Flam" arc lamps, made by Messrs. Johnson and Phillips, replace an equal number of 6-ampere Gilbert type of enclosed arcs; the height of the lamp from the ground level being 22 ft. 6 in. The ascertained maximum candle power of each "Metro-Flam" is 2500, compared with 850 for the Gilbert; so that the lighting of the square has been increased from 13,600 to 40,000 candles. The lamps are all switched on from a central position. In Portland Street, nearly all of the 16 lamps are suspended in the middle of the thoroughfare from duplicate cross-span wires attached to rosettes fixed on the fronts or corners of buildings. Where this course has not proved feasible, side poles with long arms are fixed so as to bring the lamp central with the street. There is an arrangement for the raising or lowering of the lamps to suit the best conditions for illumination. At the crossing of Portland Street with Princess Street—a busy centre—there are two lamps erected on an extension of the existing tramway standards at opposite street corners. The maximum candle power of each of the lamps is not less than 3000; and it is claimed that they will "burn for 130 hours without retrimming or touching in any way."

GAS AND WATER PROFITS AT LEICESTER.

At the Quarterly Meeting of the Leicester Town Council last Tuesday, there were submitted the reports of the Gas and Water Committees for the half year to June 30.

Alderman Smith, in presenting the accounts of the gas undertaking, said he had the pleasure of reporting another very satisfactory half-year's working; there being a profit of £669 more than was made during the corresponding half of last year. The total expenditure was £103,588, against £96,863 for the corresponding half—an increase of £7225. The chief items of increase were in coal, repairs and maintenance, and purification. The receipts amounted to £157,999, as against £150,109, or an increase of £7890. The principal items on this side were for gas sold, in which there had been an increase on every item for which they charged. It might interest the Council to know that the sale of gas by slot meters amounted to 290 million cubic feet in the last half year. The net profit was £34,021, against £33,352, or an increase of £669. After paying sinking fund and interest charges, there was a balance of £26,165. This, he believed, constituted a record in the history of the gas undertaking as far as profits were concerned. The amount promised to the Finance Committee for the current year was £32,000. In the event of the next half year being anything like equal to the one just closed, it was proposed to invite the Council to set aside another £10,000 to the reserve fund and £2000 to the renewals fund. At present, the reserve fund only stood at £39,000; whereas the amount authorized was £50,000. The amount now held in reserve represented about 3 per cent. of the capital; and he thought the Council would think this totally inadequate. He trusted they would support the Committee in raising the amount to £50,000. The Committee and the Engineer (Mr. Hubert Pooley) might be satisfied with the half-year's labour, and the Corporation and ratepayers congratulated upon having obtained such splendid results from the undertaking. Mr. Pooley had been with them just one year. He had fulfilled all the expectations formed of him, and had proved himself a most efficient Engineer.

Mr. Salt considered that, instead of allocating £10,000 to the reserve fund, it would be better to reduce the price of gas or give the ratepayers a direct benefit by improving the conditions of the town.

Mr. Lovell said only a few years ago he heard the then Chairman of the Committee state that the reserve fund was in a satisfactory condition. He moved that £5000 be placed to the reserve fund, and that £5000 be devoted to other objects.

The Mayor pointed out that the Chairman was merely expressing the hope that the Council would do as he had suggested at the end of the year. They would have an opportunity of voting upon the matter then, if it were necessary. The constant agitation for reducing the price of gas was an injurious and objectionable one. The matter had been gone into; and he was satisfied that they were charging as little for gas as neighbouring towns in the same position as they were. ("No.") This being the case, there was no pressing need for reducing the price. If they were able to make a profit on the gas, it was satisfactory, because they could not help making a loss on their water undertaking. He was in sympathy with Mr. Salt, who suggested that some of the profits should be used for the improvement of the town. The £2000 referred to had been allocated to the Highway Committee, and spent this year.

Mr. Lovell said the Mayor's explanation hardly satisfied him. Would he be in order in moving that the matter be referred back?

The Mayor: It is simply a recommendation.

Alderman Smith, in reply, said he agreed with the Mayor that it was not the proper time to talk about a reduction in the price of gas. No sensible man would hold that the reserve fund was adequate.

The report was passed.

Mr. Parsons stated that the accounts of the water undertaking for the past six months showed a net profit, after paying interest on the capital expenditure, of £15,391, or an increase of £950 over the corresponding half of last year. The Derwent Valley scheme was expected to be completed next June; and they were looking forward to receiving water from that date. The opening ceremony, he thought, would take place very shortly afterwards. The financial aspect of the scheme was most important; and the repayments would commence next year. The Committee had been anxious to make adequate provision for these repayments; but it was a difficult thing to ascertain what would be required. They had, however, obtained an estimate from the Board; and it was calculated that they would need £85,000 per annum. This was a large price to pay; but they were assured of a good supply of water for drinking and manufacturing purposes. It was a scheme from which the town would reap incalculable benefits.

The report was adopted.

BOLTON GAS UNDERTAKING.

An Elective Auditor and the Allocation of Profits.

Mr. W. A. Bridson, one of the Elective Auditors for the Borough of Bolton, has, in his annual report, like his colleague, Mr. A. Pilling (a summary of whose remarks on the subject appeared in the "JOURNAL" last week), something to say about the allocation of the profits made on the gas undertaking. He says: "Much difference of opinion exists as to the manner in which the profits of the Gas Department ought to be allocated. It is the contention of many that the provision made for the renewal of works and plant, &c., is not by any means sufficient, and that some definite basis of depreciation ought to be made. There is a balance of £37,415 in favour of the renewal account at the close of the year, the amount provided out of revenue during the year being £9136; while a sum of £21,559 for the renewal of the Lum Street and the Gas Street works has been charged against the account. Looking back at the abstract of accounts for the year ending March 31, 1902, I find that the balance in favour of the account at that date was only £6596. Since then a sum of £134,069 (in nine years) has been charged against revenue, and placed to the credit of the renewal account. Granted that during the period mentioned the profits of this undertaking were at their highest, thus enabling a fairly large sum to be used for depreciation, still, during the last three or four years the profits have been much affected by the increasing use of electric light, and the amounts of depreciation have been small. But taking the average for the nine years, the figures work out at rather over 2 per cent. per annum on the net capital outlay of £688,000."

Mr. Bridson quotes from the "Editorial Notes" in the "JOURNAL" for May 23 last (p. 506) to show that the recent extensions at the gas-works were economically carried out, and that in both running and maintenance costs an economy was found to fully justify the outlay. Dealing with the revenue account itself, Mr. Bridson says he finds that there was a slight improvement last year on the previous twelve months—the total quantity of gas supplied being about 8 million cubic feet in excess of the previous year; while the profits were larger, owing to the increased price of residual products.

METER AND GAS TESTING IN EDINBURGH.

The Official Inspector of Gas-Meters for the City of Edinburgh (Mr. William Gordon) lately presented his sixth annual report, containing an account of the working of the department under his supervision from May 16, 1910, to May 15, 1911. He states that the number of gas-meters tested was 90,247, of which 16,585 were wet and 73,662 dry; and fees to the amount of £2472 were collected. Of the wet meters, 22 were incorrect; of the dry ones, 605. The total number of meters tested by the department since its institution in 1861, up to and including the 15th of May last, was 2,519,918; and the fees received for the period amounted to £73,788. The department was recently granted the custody of a standard cubic foot bottle. Mr. Gordon says the possession of an instrument of this description is of great value, and "a decided acquisition to the equipment of a gas-meter testing department," as, owing to its portability, it can be easily conveyed to the various district testing-stations for the purpose of periodically verifying the working gasholders, twenty in number.

The department recently tested a considerable number of gas-meters which, by the addition of the coin mechanism, had been converted from the ordinary to the automatic type. The recent development in the distribution of high-pressure gas has necessitated the production of meters specially designed to meet the new conditions. Mr. Gordon points out that the registration of gas delivered to the consumer at a pressure of about 4 inches of mercury requires certain corrections; and he says it may become essential at an early date for the Board of Trade to issue instructions to the gas-meter inspectors throughout the country, so that uniformity in the testing of these meters may be ensured.

The number of automatic and ordinary gas-meters tested and examined in the twelve months covered by the report was as follows:—

	Number.	Percentage.
Automatic meters (new)	39,258	43·51
,, ,, (repaired)	9,903	10·97
Ordinary ,, (new)	32,279	35·77
,, ,, (repaired)	8,604	9·53
,, ,, tested "for certificate"	203	0·22
Total . . .	90,247	100·00

Following the report on meters is one on the testing of gas and electricity. It is stated therein that the minimum illuminating power of the gas is fixed at 14 candles when measured with a No. 2 "Metropolitan" argand burner consuming 5 cubic feet of gas per hour; the standard of light being a Harcourt 10-candle pentane lamp. Tests were carried out at various hours, chosen at the Inspector's discretion, and without any previous intimation to the Gas Commissioners of his intentions; and the average result of 306 tests for illuminating power was 16·81 candles—the minimum result being on all occasions considerably above the standard. In the experimental work of the department, a number of incandescent gas-burners, of various designs, were tested, and useful data obtained regarding their consumption and illuminating efficiency.

Sales of Shares.—Last Tuesday, Messrs. Lee and Farr sold 139 shares in the Slough Gas Company at the average price of £16 each. Next day, 22 shares in the Windsor Gas Company were sold by Messrs. Buckland and Sons. Five original £20 shares (10 per cent.) realized £44 5s. apiece; and some £8 preference shares (5 per cent.) fetched £10 10s. and £10 15s. apiece. Some £20 shares (7 per cent.) were sold at £32 15s. and £33 each; and two new shares of like nominal value, £8 paid, realized £12 5s. each.

POTTERIES WATER-WORKS PURCHASE QUESTION.

Subject Deferred.

At a Meeting of the Stoke-on-Trent (Potteries) Federated Council last Wednesday, a long discussion took place on the report of the Water Committee, referred to in the "JOURNAL" for the 26th ult., to the effect that the adjoining local authorities were all in favour of considering the purchase of the undertaking of the Staffordshire Potteries Water Company, and recommended that the Corporation should take immediate steps to acquire it, either alone or in conjunction with other authorities; and that the Committee should be authorized to proceed with the negotiations, and submit to the Corporation a definite purchase scheme.

The adoption of the report having been moved and seconded, reports on the subject by experts were submitted. Mr. G. C. T. Parsons estimated that the acquisition of the Company's undertaking would cost £979,300; and he did not think it would entail any serious charge on the rates. Mr. W. Fox, M.Inst.C.E., of Westminster, dealt with engineering matters, and estimated that the cost of repairs under the scheme would be £6750, compared with £3831, the average actual outlay during the past ten years.

An amendment was moved by Mr. Sampson Walker, to the effect that, in view of the exceedingly high rates in the borough, the Council declined to proceed further in the matter at present. He quoted figures to prove the improbability of the purchase of the undertaking at a reasonable price. Mr. Townsend, in supporting the amendment, expressed the opinion that the Council could not give the necessary time to supervise properly the undertakings they had in hand at present; and Alderman Goodwin thought they were reasonably served by the Company. If they wanted concessions, they ought to be strong enough to secure them now that they were federated. Alderman Malkin said the Committee had not put any definite scheme before the Council; and he would not vote for the adoption of the report unless they had some facts and figures before them. Mr. W. Walker considered that, with their rates at 10s. in the pound, the time for purchase was inopportune. He would like to acquire the water undertaking; but they could not really afford it. Alderman Geen (the Deputy-Mayor and the Chairman of the Finance Committee) remarked that the rates of the borough seemed to be fixed for years at the present figure; in his opinion, the purchase of the water undertaking was more likely to increase than reduce them. Several speakers were not satisfied that the undertaking could be purchased without addition to the rates; and on this account they decided to vote for the amendment. This, on being put, was carried by 40 votes to 22. Another amendment was subsequently carried deferring the matter until the Water Committee had further considered the question and submitted a scheme to the Council.

ASHTON AND DISTRICT JOINT WATER BOARD.

Ninth Reservoir Nearing Completion.

The impounding reservoir which has been under construction since 1908 for the Ashton, Stalybridge, and Dukinfield (District) Water Board up the Chew Valley is now practically complete. The area of water impounded is 43·5 acres; and the reservoir will have a holding capacity of about 200 million gallons. The length of the earth dam is 990 feet, with 363 feet of a north wing trench. The core of the embankment is made of clay puddle, resting on a cement concrete saddle or shoe; and the greatest depth in the excavation of the trench is about 110 feet below the surface of the ground. Including all the subsidiary works, the cost of the scheme will be about £110,000. The Consulting Engineers for the works are Messrs. G. H. Hill and Sons; and the Contractors, Messrs. Morrison and Mason, of Glasgow. It is intended that the water impounded in the new reservoir shall be used mainly for compensation; but in case of necessity it can be employed for domestic purposes by means of the excellent filtration plant.

Including the three service reservoirs which supply Ashton and Dukinfield, the Joint Water Board have eight reservoirs, apart from the one now being completed in the Chew Valley; and their total holding capacity is 882,939,000 gallons. When the Chew Valley works are completed, therefore, the holding capacity will have been increased to about 1083 million gallons. The sources of supply are three valleys—viz., Swineshaw, Greenfield, and Chew—with the following drainage areas: Swineshaw, 1300 acres; Greenfield, 1170 acres; and Chew, 1730 acres—total, 4200 acres. The parliamentary limits of supply sanctioned by the Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Water Act of 1870 consists of an area of 42 square miles, or 26,880 acres, with an estimated population supplied of between 150,000 and 160,000.

LINCOLN WATER SUPPLY.

Completion of the Elkesley Scheme.

The new scheme of water supply for Lincoln which has been carried out at Elkesley, from the plans and under the supervision of the Corporation Water Engineer (Mr. Neil M'Kechnie Barron), at an estimated cost of £248,000, will be formally opened to-morrow by the Mayor (Mr. Clement H. Newsum), in the presence of a numerous company. The works have been designed for a maximum supply of 3 million gallons a day for Lincoln, in addition to 600,000 gallons daily for the Nottinghamshire villages which the Corporation are bound to supply under the provisions of the Lincoln Water Act, 1908. Readers of the "JOURNAL" may remember that, before application was made or the Act, Lincoln had been in great trouble in regard to the water supply; and the Elkesley scheme was adopted by the Corporation on the recommendation of Mr. Barron. In view of its successful completion, it may be interesting to sketch briefly, from a communication in the Engineering Supplement to "The Times" last Wednesday, the

history of the undertaking of which it will be so valuable an adjunct, and give an indication of its principal features.

Before the Lincoln Water-Works Company was formed by Act of Parliament in 1846, the water used by the inhabitants was obtained from wells and from the old conduit fountains which are still in existence, though recently the supply from the spring to the fountains has been cut off, owing to the source being liable to pollution. Under the Act, the Company constructed a reservoir of about 40 million gallons capacity on the Prial Brook at Hartsholme; some 20 million gallons of the total being available for the supply of the city. An aqueduct about 2½ miles long was constructed from Hartsholme Lake to the pumping-station at Boultham, and filter-beds, engine-houses, &c., were built there.

In 1871, the water undertaking was transferred to the Corporation; and from time to time additions have been made to the works as required by the increase in consumption. About 1881, a further supply of water was obtained from the ballast pits and the River Witham; the city and district being then supplied from three sources—viz., Hartsholme Lake, the ballast pits, and the River Witham. The water from all these sources was of indifferent quality, especially in times of flood; but five years ago works were constructed which made it possible for the river water to be entirely dispensed with at these times. The filtration works at Boultham were also brought thoroughly up to date, and a new aërating tank and clear-water reservoir constructed. These alterations were designed and carried out by Mr. Barron on his appointment as Water Engineer to the Corporation.

The rapid increase of the population of Lincoln brought the question of an entirely new water supply to the close attention of the City Council; and in 1901 a deep boring was started at Boultham to the bunter formation of the new red sandstone. This boring, after many difficulties had been overcome (including the loss of the boring-tool for more than twelve months), was completed in 1906. With a depth of 2200 feet, it is the deepest boring in the country. The yield of water, so far as quantity is concerned, is satisfactory—upwards of a million gallons a day being available. But mineral salts are present in such large quantities that the water is useless for domestic and trade purposes. The consumption being more than 2 million gallons a day, the Corporation decided, on the advice of their Engineer, to undertake a completely new scheme for the supply of the city with water from Elkesley, in Nottinghamshire. The water is derived from probably the largest outcrop of the pebble beds of the new red sandstone in England.

The collecting works are situated near the village of Elkesley, 22 miles from the city. At present they consist of four boreholes taken down to within 30 feet of the base of the pebble beds. The diameter of these is 36 inches at the surface and 28 inches at a depth of 300 feet. It is then reduced to 20 inches; and this size is maintained to the full depth of the boreholes, which is 570 feet. They are lined to a depth of 90 feet with 33-inch lap-welded tubes and grouted; and to a further depth of 80 feet (making a total of 170 feet) they are lined with 29½-inch lap-welded tubes, not grouted. The rock to the depth of 170 feet was soft; but beyond it was quite firm. The natural rest level of the water is 30 feet from the surface of the ground. Before the contracts for the work other than the borings were let, test pumpings to prove the quality and quantity of the water were conducted in the first borehole continuously for 22 days; and the results were considered most satisfactory.

The quality and quantity of the water having been proved, a start was made with the large works for conveying the water to Lincoln and its distribution there. The pumping-station at Elkesley consists of a large engine-house, a pump-room under it, a boiler-house, coal-store, workshop, economizer-house, feed-pump room, &c. The pumping machinery consists of two marine type inverted triple-expansion engines working with a steam pressure of 180 lbs. per square inch. Each is of approximately 500 B.H.P., and is capable of pumping 3½ million gallons of water per 24 hours at its full speed of 24 revolutions per minute. The high-lift three-throw pumps, on which the maximum head (including friction) is 424 feet, are direct-driven; and the borehole pumps, the buckets of which are placed 300 feet from the surface, are driven from overhung cranks, one at each end of the crank-shaft. The borehole pumps deliver the water into a semicircular settling-tank just outside the pump-room wall, from which, after any red sand in suspension has settled, the high-lift pumps take the water for delivery to Lincoln. Three Lancashire boilers are provided, two of which are required to supply steam, and one is kept as a stand-by.

The rising main, 21 inches in diameter, is 22 miles long. It is of cast iron except for stream and railway crossings, where it is of lap-welded steel tubes. The River Trent is crossed by a steel bridge of six spans—one of 262 feet and five of 66 feet. The bridge has sufficient width for a second line of pipes. At Lincoln the water is delivered into a steel tank of 300,000 gallons capacity, supported by a brick and stone tower, 110 feet high. When the tank is full, the water passes by gravitation through the city trunk main, 3½ miles in length, to the new Bracebridge Heath reservoir, situated on the hill to the south of Lincoln. The main consists of cast-iron pipes from 21 to 18 inches in diameter. The low-level district of the city is supplied from the trunk main *en route* to the reservoir during pumping operations; and when these cease, from the reservoir direct.

The service reservoir has a capacity of 6 million gallons, which is equal to two days' supply for the population for which the works have been designed. It is circular on plan—the main wall being of concrete—and is covered with a reinforced concrete roof. Special provision is made for the circulation of the water, which is introduced at eight points round the circumference, and also at the centre, and is withdrawn from one point at the side. Connected with the reservoir outlet-house is a small water-tower for the supply of the district in its immediate vicinity. The water passes first into the tank in the tower, and then overflows into the reservoir.

Messrs. Mather and Platt, Limited, of Manchester, have had placed with them by the Sheffield Corporation Water Department a contract for 32 mechanical pressure filters and auxiliary plant capable of dealing with 6 million gallons of water per day.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The work of the Scottish Junior Gas Association is now fully inaugurated for the winter. A very successful, well attended, and useful meeting of the Eastern District was held this afternoon in Edinburgh, at which the new President—Mr. John R. Moyes, of that city—delivered an introductory address, which contained many details that will be of use to members contemplating extensions of works. Mr. A. Canning Williams, the Treasurer and Collector to the Edinburgh and Leith Gas Commissioners, gave an exceedingly lucid account of the up-to-date methods of working pursued in his department—an address which was in all respects eminently suited for an assemblage of juniors. The District is in a flourishing condition, with a membership, adding those who joined to-day, of now over 100. An excellent programme for the session has been drawn up; and with such zealous gentlemen in charge of the district as Mr. Moyes and Mr. W. Geddes, the Hon. Secretary, the present session ought to be a profitable one.

We have now the full tale of the valuation problem which has been raised with reference to the works and plant belonging to the Edinburgh and Leith Gas Commissioners; and were it not that there is a real interest involved, the situation as it stands at present could only be described as a comic one. Last week, it will be remembered, the Valuation Court in Leith had heard the case, and had taken time to consider their decision; and the Court in Edinburgh had heard Mr. Duncan Millar on the Commissioners' case—his plea being that the Assessor ought to have deducted, before fixing the valuation, £259 of feu-duties, and £7819 as the landlords' proportion of rates and taxes. On Monday, the Court in Edinburgh resumed consideration of the appeal. The Hon. W. Watson, for the Assessor, recognized that, in a case of this kind, everything was hypothetical; and he considered that the most that could be hoped for was that an amount would be fixed which would approximate nearly to the rent, and would not unduly press upon the undertaking, but would render the subjects liable to their fair share of public burdens. He looked upon it as monstrous that the Gas Commissioners should ask that landlords' taxes should be deducted. It was even more monstrous that they should ask feu-duty to be deducted. This duty was the condition of the subjects' existence, and had nothing to do with the expenditure of the undertaking. He quoted the case of the City Parish of Glasgow as a direct authority for the proposition that taxes and such-like public burdens were in an entirely different position from such expenses as were absolutely necessary to keep the undertaking in an efficient condition. The Court dismissed the appeal; and a case for the Higher Court was asked for.

On Tuesday, the Leith Court gave their decision, which was to a different effect from that of the Edinburgh Court, in that they allowed deduction of landlords' taxes, but not of feu-duty. The undertaking within the burgh of Leith consists of underground piping and a workshop. These were entered by the Assessor at the figure of £3503. The Gas Commissioners sought a reduction to £3051. In terms of the decision of the Court, the figure has been adjusted at £3059—£2786 for pipes and £273 for the workshop. On Wednesday, the Midlothian Valuation Court was held, before which the Gas Commissioners also had an appeal, in respect of the part of their undertaking within the county. They wished the valuation entry reduced from £2515 to £2323. Mr. A. Lynch, the Assessor, said he thought that Lord Low, in the 1909 case, did not mean his judgment to apply to other expenditure than the actual expenditure upon the management, maintenance, and repairs. He did not think that feu-duties and owners' taxes entered into the judgment at all. The principle which had always been acted upon was that the full expenditure upon management, maintenance, and repairs was to be allowed, but that no allowance was to be made for owners' taxes, nor for disbursements which a landlord might be called upon to make out of his rent. The Court sustained the appeal on both points. The three decisions thus differ the one from the other. The Edinburgh Court allows neither of the deductions claimed by the Gas Commissioners; the Leith Court allows the larger of the two; and the Midlothian Court allows both. All three decisions are to be appealed to the Court of Session, where an authoritative decision will be given. The Appeal Court there used to sit in March; but I observe that this year the date has been altered, and that the Court will meet on Dec. 5, and daily thereafter; so that a final decision on the questions raised will not be long deferred. It would be a somewhat entertaining situation if the Supreme Court were to decide, differing from all the three Courts, that feu-duties were to be allowed, but not landlords' taxes. But we must not anticipate.

I may explain, for the benefit of Southern readers of the "JOURNAL," that in Scotland the practice is that a person owning land and giving off part of it for building purposes does not part with it outright. Freehold in land is all but unknown. The landowner, known as the superior, gives off a portion of land in feu, for which he charges duty yearly. These feu-duties are paid by the person who acquires the feu, in his capacity of landlord of the premises erected. In his capacity of landlord, he may let the subjects to a tenant, who will pay him rent, and out of the rent he will pay the feu-duties; and also landlord's taxes. In the case of the Gas Commissioners, the feu-duties and the whole of the taxes are paid by the Commissioners—the feu-duties to the superiors and the taxes to the various levying bodies. The landlords, or owners, of the gas undertaking, are the ratepayers of Edinburgh and Leith. They are precluded from earning profit from the undertaking. They therefore receive no rent from the Gas Commissioners; and, receiving no rent nor other consideration, they pay no feu-duties. These two burdens are entirely borne by the Gas Commissioners, who are, to all intents and purposes, the tenants and occupants of the undertaking. The feu-duty has to be paid out of the revenues of the undertaking, and paid by the tenant—it being only a fiction, in this instance, that it is a charge upon the landlord; and therefore there would seem to be good reason why the amount of the duty should be deducted from the revenue before the valuation is arrived at. As to landlords' taxes, they are simply a proportion of the gross taxation which has been allocated

by the Legislature to landlords; and where landlords pay this proportion, out of the rents they receive, there may be reason for holding the amount to be not an outlay of the undertaking. But where there is no landlord entitled to profit, and the whole sum is paid by the tenant, this reason disappears, and it seems to me that there is the strongest reason for holding the charge to be one upon the tenant, and therefore that the amount should be deducted. If the Gas Commissioners are successful in their appeals, the result will be a considerable modification in the valuation of all municipal undertakings. Gas undertakings will benefit very largely by the deductions; and this consideration raises these appeals into a position of prime importance.

The Edinburgh and Leith Gas Commissioners on Monday had before them the estimates for the current year, which had been prepared by Mr. A. Canning Williams, the Treasurer and Collector, and Mr. A. Masterton, the Engineer. The revenue from the sale of gas was arrived at by taking the same quantity as was sold last year and assuming that no change would be made in the present prices. The amount was £5704 less than for 1910-11, owing to the fact that the reduced charges for gas—2d. per 1000 cubic feet—applied only to the latter half of that year. The figures submitted showed a surplus profit of £552. It was advised that existing charges for gas should be continued—the charge to ordidary consumers being 2s. 8d. per 1000 cubic feet. This was agreed to.

In the Rothesay Town Council on Thursday, it was reported that there was a surplus of £332 in the gas account for the past year. As there was also a reserve of £526, Dean of Guild Macmillan moved that the price of gas be reduced by 2½d. per 1000 cubic feet. The motion was not adopted by the Council, who were influenced by the considerations that a new gasholder will be required very soon, and that there is uncertainty as to the price of coal during the year.

The Falkirk Town Council this week considered their annual accounts, and, among other things, they advanced the price of gas by 1d. per 1000 cubic feet; making the charges—for lighting and for cookers 2s. 10d., for prepayment meters 3s. 3d., and for motive power 2s. 5d. Treasurer Wallace said that last year they reduced the price by 3d. per 1000 cubic feet. They did so in the belief that they were going to have an increase of 5 per cent. in the consumption. They had only had an increase of 1½ per cent.; and there was a deficiency of £500. For the current year they estimated that they would have a revenue of £33,791, and an expenditure of £22,351; leaving a gross surplus of £11,439, which would be subject to sinking fund and other charges; and the net surplus at the end of the year was expected to be £253. In a discussion which followed, it transpired that it was proposed to take £200 from the gas account towards meeting the costs of the burgh extension Order, which was rejected by the Parliamentary Commissioners last summer. Some dissatisfaction was expressed that the water account should not also be charged with a proportion of the cost, but nothing was moved, and the gas accounts and estimates were adopted.

The Peebles Town Council held a special meeting as Gas Comissioners on Thursday, to consider the accounts of the Gas Department for the year. Provost Ballantyne said the Commissioners were glad to report that the undertaking was in a very satisfactory state indeed. The make of gas for the year was 1,361,000 cubic feet over the previous year, and the revenue from the sale of gas was £222 more. The cost of manufacture was only £3 more, so that the undertaking had been managed with great skill and ability. The revenue from gas was £6106. There was an increase of £14 from residual products, and of £1 from cooker-rentals. The total expenditure was £7090—£8 more than in the previous year. The total revenue was £7487; and there was a balance of profit of £397. This sum added to the amount of £53 brought from the previous year left a balance on the right side of £450. They estimated an expenditure of £7157 for the current year, and a revenue of £7512, leaving a surplus of £425; so that at the end of next year they estimated to have a balance in hand of £875. With this sum they might reduce the price of gas; but in view of the renewals of gas plant, and of their not having allowed anything for depreciation of plant, the Commissioners considered that it would be unwise to reduce the price of gas in the meantime. The accounts were adopted; and the Council unanimously agreed, in view of the highly successful way in which the Manager—Mr. A. Bell—had managed the undertaking, to show their appreciation of his services by voting him an increase of salary at the rate of £25 per annum.

A special meeting of the Brechin Town Council was held on Monday in connection with the proposed purchase by the town of the undertaking of the Brechin Gas Company, Limited. The Council agreed unanimously to adopt the Burghs Gas Supply (Scotland) Act of 1876, and that the first statutory meeting should be held in October.

The Directors of the Banchory Gaslight Company reported to the shareholders on Monday that the net profit for the year, after writing off £56 for depreciation, amounted to £209, out of which the usual dividend of 1s. 3d. per share would be paid. The price of gas was reduced from 6s. 8d. to 6s. 3d. per 1000 cubic feet; and a scale of discounts, ranging from 5 to 15 per cent., was adopted.

The Gas Committee of the Dunfermline Town Council have agreed to recommend that the price of gas to consumers in Limekilns and Charlestown be reduced to 4s. per 1000 cubic feet.

The final meeting of the Carnoustie Gaslight Company was held last Saturday; the meeting taking place, by the courtesy of the Town Council, in the gas-works. The accounts of the Liquidator were submitted and unanimously adopted. After paying a first dividend at the rate of £4 per share, there remained a sum of £1180. This the meeting agreed should be divided as follows: To the Liquidator, £400; to the Directors, £180; to the Auditors, £40; to the employees at the gas-works at the time of the transfer, £60; and to the shareholders a final dividend of 2s. 6d. per share—£500.

Increased Water Storage at Cowes.—A contract for a new water reservoir to be constructed of ferro-concrete, for £3330, has been accepted from Messrs. W. H. Brading and Son by the East Cowes Urban District Council. The Shanklin Urban District Council have offered a supply of water from the Chillerton works at a cost of 10d. per 1000 gallons; the contract to be for thirty years, subject to an immediate stoppage should any shortage occur. The matter is under consideration.

CURRENT SALES OF GAS PRODUCTS.

[For Table of "Tar Products Prices," see p. 61.]

Sulphate of Ammonia. LIVERPOOL, *Sept.* 30.

In the early part of the week business in this article was still of a lethargic description; but during the last two or three days there has been a distinct improvement in the demand, and advanced prices have been paid at all points of delivery. The purchasing has again been mainly for dealers' account, but consumers have shown more interest than has recently been the case. The closing quotations are £14 1s. 3d. per ton f.o.b. Hull, £14 2s. 6d. per ton f.o.b. Liverpool, and £14 5s. per ton f.o.b. Leith. Few transactions have transpired in the forward position; but it is reported that £14 2s. 6d. per ton f.o.b. Liverpool was paid for equal monthly quantities up to the end of the year, and £14 5s. per ton f.o.b. Leith for October-March.

Nitrate of Soda.

This article continues very firm, and holders maintain their quotations at 10s. per cwt. for ordinary and 10s. 3d. for refined quality, on spot.

LONDON, *Oct.* 2.

Tar Products.

The markets for tar products remain firm. There is practically no alteration in the market for pitch. There is a fair amount of inquiry which keeps prices steady. Creosote is still in demand, and very good prices are being paid for delivery over the best part of next year. Benzols are steady; and fair prices are being paid for prompt delivery. In crude carbolic, the market continues very firm. Distillers on the whole are asking in the neighbourhood of 2s. 2d. per gallon; but there are no buyers at this price. Solvent naptha is steady.

The average values during the week were: Tar, 21s. to 25s. *ex* works. Pitch, London, 40s. 6d. to 41s. 6d.; east coast, 40s. to 41s.; west coast, Manchester 39s. 6d. to 40s. 6d., Liverpool 40s. to 41s., Clyde 40s. to 41s. Benzol, 90 per cent., naked, London, 8¾d. to 9d. f.o.b., North, 8¼d. to 9d. f.o.b.; 50-90 per cent., naked, London and the North, 7¾d. to 8d. f.o.b. Toluol, naked, London, 8½d.; North, 7¾d. to 8d. Crude naphtha, in bulk, London, 4d. to 4¼d.; North, 3¼d. to 3½d. Solvent naphtha, naked, London, 9¼d. to 9¾d. f.o.b.; North, 8d. to 8½d. f.o.b. Heavy naphtha, naked, London, 10½d. to 10¾d. f.o.b.; North, 9d. to 10d. f.o.b. Creosote, in bulk, London, 2 9/16d. to 2⅝d.; North, 2⅜d. to 2½d. Heavy oils, in bulk, 2⅞d. to 3⅛d. Carbolic acid, casks included, 60 per cent., east coast, 2s. to 2s. 2d.; west coast, 1s. 11d. to 2s. 1d. Naphthalene, £4 10s. to £9 10s.; salts, 42s. 6d. to 45s., bags included. Anthracene, "A" quality, 1⅛d. to 1⅜d. per unit, packages included and delivered.

Sulphate of Ammonia.

There has been a little more inquiry for this article during the past week, and the market seems somewhat steadier. Actual Beckton is still quoted £13 15s. Outside London makes are £13 7s. 6d.; Hull, £14; Liverpool, £14 to £14 1s. 3d.; Leith, £14 5s.; Middlesbrough, £14.

COAL TRADE REPORTS.

Northern Coal Trade.

The coal trade has shown ease in steam coals, such as is usual at this time of the year, when the demand for the Baltic generally falls off. Best Northumbrian steam coals are now from 11s. to 11s. 3d. per ton f.o.b., second-class steams are 9s. to 9s. 9d., and steam smalls are from 5s. to 6s. The production at the collieries is fairly good; and so far it is well taken up, though not so much is sold forward. In the gas coal trade, there is an enhanced and increasing demand, and prices are firmer. Durham gas coals are from 10s. 10½d. to 11s. per ton f.o.b. for best kinds; seconds are from 9s. 6d. to 10s. 3d.; and "Wear specials" are near 11s. 6d. The Gothenburg contracts for gas coal have been allotted—some 20,000 tons, at about 15s. 5d. per ton, delivered, for best Wear kinds, according to report. Tenders have also been sent in for some 40,000 tons of best Durhams or "specials" for the Bologna Gas-Works; but no result is yet known. There are, too, offers for cargoes for some of the Italian towns; but prices are not easy to arrange. Coke is rather firmer. Gas coke is now in rather heavier output; and the general quotation is from 14s. 3d. to 14s. 6d. per ton f.o.b. in the Tyne or Wear for good makes.

Scotch Coal Trade.

The activity which has been noted continues. Ell and splint for shipment are in particularly good request. Steam coal is plentiful. Washed stuffs and dross are finding a ready market. The prices now quoted are: Ell, 9s. 6d. to 10s. 6d. per ton f.o.b. Glasgow; splint, 10s. 3d. to 10s. 6d.; steam, 9s. 3d. to 9s. 6d. The shipments for the week amounted to 384,018 tons—an increase on the preceding week of 29,990 tons, and on the corresponding week of 51,341 tons. For the year to date, the total shipments have been 11,960,054 tons—an increase on the corresponding period of 231,558 tons.

Reinstatement after Burst Water-Mains.—A letter has been received by the Works Committee of the Hammersmith Borough Council from the Metropolitan Water Board, upon the question of the payment of charges made by the Metropolitan Borough Councils in respect of the reinstatement of paving damaged in consequence of the bursting of the Board's mains, and giving notice that in all future cases of this nature the Board will adhere strictly to their legal rights; and, in the absence of notice under section 112 of the Metropolis Management Act, 1855, payment will only be made in respect of the reinstatement of so much of the area of the roadway as is disturbed in effecting repairs to the main in question. The Committee have instructed the Borough Surveyor to comply as far as possible with the requirements of the Board; but they have given directions for the Board to be informed that the Council cannot accept the notice as in any way affecting the Board's responsibility for any damage caused to the pavement by the bursting of the mains.

Birmingham Gas-Fitters and Municipal Enterprise.

A meeting of the Birmingham Association of Master Gas-Fitters was recently held for the purpose of discussing the proposal of the Birmingham Gas Department to supply and fix gas-fires free of charge, subject to a small quarterly rental. The proceedings were private, but, according to information furnished to the "Ironmonger," the attendance was very large, and the discussion free and sometimes uproarious—resulting in both the President and the Secretary resigning, to mark their disapproval of the line of action decided upon. Our contemporary last Saturday made the following remarks upon the matter: "We understand that the action of the Gas Department in undertaking outside shop lighting on the hire-purchase system and gas heating on the permanent hire system has occasioned widespread resentment throughout the trade, and caused many gas-fitters to join the Association who had held aloof. These men are mostly hostile to the policy of the Association, which has been to accept the principle involved in the supply and erection of gas-consuming appliances by the Municipality, and to make the best terms possible with the Gas Department for their own employment; and it is evident that their object in joining the Association is to overthrow that policy, and afterwards fight the Gas Department tooth and nail. At the meeting there was a keen struggle between the rival factions. Some of those already in the Association joined forces with the new-comers, who, in the end, succeeded in carrying a resolution expressing a desire to continue the arrangement under which certain approved gas-fitters are employed by the Gas Department; refusing to negotiate as a corporate body with the department in regard to the erection of warming-stoves, but permitting freedom of action to those members who felt disposed to enter into negotiation with the department individually, on their own account. The President, regarding the acceptance of this resolution as a vote of censure, immediately resigned, and the Secretary first resigned, and then, metaphorically, pitched the resolution into the waste-paper basket. We understand that in the course of the discussion it was stated that where an ironmonger or a gas-fitter succeeded in obtaining an order for the department for the erection of a stove, he was to have a commission of 6d. and the job to fix the stove. Also the price to be paid for fixing outside lamps was 12s. 6d., whereas the actual lowest cost of materials and labour involved, all of which the gas-fitter would have to find, was 12s. 7d."

Commencement of the Birkenhead Water Scheme.—Tangible evidence of the progress of the new scheme for supplying Birkenhead with water will be seen to-day, when the foundation stone of the first section of the work will be laid by Mr. Alderman Bloor, the Chairman of the Water Committee of the Corporation. For several months a large number of men have been engaged in preparing for the erection of the great dam that will impound the waters of the River Alwen, from which the future supply to the borough is to be drawn; and to-day's function will mark the beginning of the water scheme itself.

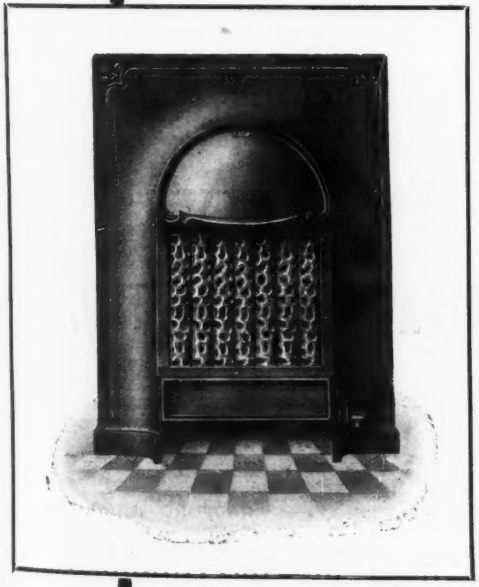
Competition in the Scottish Oil Market.

According to the "Financial News," oil shares were the "bright particular star" of the Glasgow and Edinburgh Stock Exchanges last Wednesday afternoon, when quite a spurt was brought about by a report that the companies had come to an arrangement which would terminate the war of prices. Definite confirmation of this report was not obtainable; but that it is not impossible, or even improbable, was indicated by the intimation, recently made in our contemporary, that the Scottish companies, together with the Standard Oil Company and the local representatives of the Royal Dutch Shell Transport Combine, were negotiating as to the contract prices of burning oil. An Edinburgh correspondent of "The Times," however, telegraphed next day that inquiries made in well-informed quarters had failed to elicit any confirmation of the statements that the conflict between the Standard Oil Company and the Asiatic Petroleum Company was nearing an end. On the contrary, there was no doubt, he said, as to the continuance of the keen competition, for at a further meeting of the Directors of the Scottish Mineral Oil Companies held in Glasgow to consider the question of fixing prices over the ensuing season, it was again found impossible to come to an agreement—the main obstacle being the keen foreign competition.

Torquay Gas Company.—At the half-yearly meeting of this Company last Tuesday, the Chairman (Mr. R. P. Kitson) stated that, notwithstanding the keen competition, the output of gas had increased by 5½ million cubic feet in the six months ended the 30th of June; and since that date there had been a further increase of 4·6 million cubic feet. He attributed this to the decrease in the price of gas; and the Directors would take the earliest opportunity of considering a further reduction, because he believed the cheaper the gas the more extensively it was used. The balance-sheet submitted by the Secretary (Mr. S. H. Easterbrook) showed a surplus of £616 after the payment of dividends at the rates of 10 and 7 per cent. per annum.

Macclesfield Corporation Gas Undertaking.—The Auditors appointed under the Macclesfield Corporation Act, 1882 (Messrs. Morris, Gregory, Holmes, and Hansford, of Manchester), have presented their abstract of the accounts of the borough for the financial year ended the 31st of March last, as prepared by the Accountant (Mr. J. W. Herringshaw). They show that the sale of gas yielded a revenue of £24,392; residuals produced £5841; and the total receipts were £30,994. The expenditure on the manufacture of gas amounted to £14,684; on distribution, to £725; and on management, to £492—the total expenses being £18,717. There was consequently a balance of £12,277, compared with £11,150 for the preceding year. After payment of dividends and the instalment of the sinking fund, amounting in all to £4002, there was left a net profit of £8275, against £7150. A sum of £6650 was transferred to the district rate, and £500 paid into the maintenance fund.

THE "MAIN" MODEL.



Last year's type "D.S.O." Fire is the model upon which most of this season's new pattern fires have been designed.

"Lengthened fuel," "Projections inside fuel to give greater contact with flame," "Fuel tapered to fit flame," these are a few of the "new" features introduced this year in the fuel alone.

Those familiar with our "D.S.O." Fires will recognize the origin of these features. To imitate is not to equal, however, and our fires are still the most efficient. And they have been further improved (particulars shortly).

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WORKS: Gothic Works, EDMONTON, N.; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
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The Resignation of Mr. J. H. Brown.

The report of the Gas Committee of the Nottingham Corporation in regard to the resignation of Mr. J. H. Brown, the Engineer and General Manager of the gas undertaking, as announced last week in the "JOURNAL," came before the City Council yesterday. Its adoption having been formally moved by Mr. Albert Ball, the Chairman of the Committee, Mr. Gregg asked whether any reason could be given for the resignation of so prominent an official as the Gas Engineer. The Mayor (Sir Edward Fraser) deprecated discussion of the matter, observing that it was not wise, by having any debate, that either the Committee or the official concerned should be damaged. The report was then accepted without further remark.

Additional Plant for the Blackpool Gas-Works.—The Gas Committee of the Blackpool Corporation have decided on making a further addition to the plant at the gas-works. It will include a mechanical stoker similar to the one recently put in, coke-handling plant, and Glover-West vertical retorts.

Proposed Lighting Tax in Paris.—Among the proposals made by M. Klotz, the Minister of Finance, to meet the deficit in the French Budget for 1912 is a tax on electricity and gas. M. Klotz reasons that while paraffin was and is heavily taxed, its modern rivals have so far escaped without the payment of any duty. He therefore proposes to tax all gas and electricity used "indoors"—the former at the rate of 1 c. per cubic metre (2·7d. per 1000 cubic feet), the latter at 0·5 c. per kilowatt-hour; on acetylene used for lighting, a "manufacturing" tax of 4 f. per 100 kilos. (say, 32s. 6d. per ton) of carbide will be levied. It is estimated that the proposed duties will enrich the Treasury by about £600,000 per annum. National institutions, schools, &c., will be exempt; and it is not proposed to interfere with street lighting, or with the lights used in railway carriages or other vehicles.

The Vertical Gas-Retort Syndicate, Limited, state that an additional order for Dessau verticals has been placed—viz., for three benches of twelve 4-metre retorts (36 retorts in all) for Schneidemühl, Germany.

Messrs. Moreau and Boxhorn ask us to intimate notice of removal of their Paris office from 28, Rue de Sévigné to 50, Boulevard Haussmann. Their telegraphic address will, however, remain unchanged—"Benzole-Paris."

According to the abstract of accounts of the Salford Borough Treasurer for the past financial year, the net debt on the gas undertaking on the 31st of March was £521,663. The gross profits on the year's working were £68,506. Rates and taxes absorbed £17,254; and the amount handed over in relief of rates was £15,750.

A Local Government Board inquiry was conducted at Accrington last Wednesday into the application by the Accrington District Gas and Water Board for sanction to borrow £16,600 for the purpose of purchasing property contained within 403 acres of land surrounding the Dean Clough reservoir. There was no opposition.

The Portsmouth Guardians have placed a contract with the Portsea Island Gas Company to substitute incandescent burners for the present flat-flame burners throughout the building known as "The Children's Home" at the Workhouse, at a cost of £60. There was a counter proposition to substitute the electric light, the expense of which would have been £260.

At a meeting of the Oldham Corporation Gas Committee last Wednesday, Mr. Arthur Andrew, the General Manager, in answer to a question, said the department had now 4000 prepayment meters in use; and he added that the cost of repair was not so much as the difference between the cost of gas supplied in this way and that of gas supplied through ordinary meters.

The Directors of the Barnard Castle Gas Company have placed a contract with Messrs. Brown and Kincaid, of Glasgow, for laying a 3-inch main of Mannesmann steel tubes from the gas-works to the villages of Lartington and Cotherstone, a distance of four miles. The gas will be sent forward at high pressure by means of compressors at the works, and be reduced by governors to the local requirements.

Messrs. J. & W. B. Smith, of Farringdon Road, E.C., have issued their season 1911-12 catalogue of gas-fittings, globes, and accessories. It is a comprehensive lighting list—ranging, as it does, from bijou inverted fittings for internal illumination, to high-power lamps for the lighting of large areas. A point which attracts notice in glancing through the catalogue, is the large and varied assortment of beaded shades that are illustrated.

As announced in the "JOURNAL" last week, Mr. J. T. Moore will offer for sale next Thursday, at the Store Old Committee-Room, Annfield Plain, 149 £10 cumulative preference shares (5 per cent.) in the Annfield Plain and District Gas Company. This issue will complete the authorized share capital. The Company's profits last year amounted to £2636; and the dividends paid were at the rates of 7 and 5 per cent. on the ordinary and preference shares respectively.

The Australian Coking and Bye-Products Company, Limited, has been formed with a capital of £200,000, in £1 shares, and is issuing 100,000 shares at par. The Company is being floated to carry on the business of manufacturers of, and dealers in, coke, coal-tar, and other bye-products of coal; and it is proposed to erect a modern coking and bye-product plant in the neighbourhood of Newcastle, in the northern colliery district of New South Wales—the most important coalfield in Australia.

The booklet on their new "barless" gas-fires which is being circulated by the Davis Gas-Stove Company, Limited, and of which we have received a copy, contains an explanation of the new departure they have made in the construction of gas-fires; the essential feature of the above-named series being the exceptional facilities given for interchangeability, and consequently for maintenance. In addition to the letterpress, which is accompanied by numerous illustrations, there are three very effective coloured plates, showing the firm's stoves in a drawing, a dining, and a bed room. These artistic productions take the booklet out of the ordinary class of trade catalogues, and impart special value to it.

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TAR PRODUCTS PRICES.

Representative manufacturers give the following as fair current values for the week ending Sept. 30. Prices are net, and they include the usual packages and delivery f.o.b., f.a.s., or f.o.r., as customary.

Article.	Basis.	London.	North-East Coast.	East Coast, Yorks.	West Coast.		Glasgow.
					Liverpool.	Manchester.	
Tar, crude	per ton	—	20/- 25/6	21/- 25/-	—	—	—
Pitch	,,	40/-	40/- 40/6	40/-	40/-	39/-	40/-
Benzol, 90%	per gallon	1/0½	-/10	-/9½	-/9¼	-/9¼	-/10½
Benzol, 50-90%	,,	—	-/10	-/9	—	—	—
Toluol, 90%	,,	—	-/10 -/10½	-/9	-/10	-/10	-/10
Crude naphtha, 30%	,,	—	-/4¼	-/3¾	-/3¾	-/3¾	—
Light oil, 50%	,,	—	-/3½	-/3¾	-/3½	-/3½	—
Solvent naphtha, 90-160	,,	—	-/10 -/10½	-/10	-/10	-/10	-/11
Heavy naphtha, 90-190	,,	—	-/11	-/11	-/11¼	-/11½	-/11
Creosote in bulk	,,	-/2¾	-/2¼	-/2¼	-/2⅛	-/2⅛	-/2
Heavy oils	,,	—	-/2½ -/2⅝	-/2¼	-/2¾	-/2¾	-/2¾
Carbolic acid, 60's	,,	2/4	2/2	2/3	—	—	2/2
Naphthalene, crude drained salts	per ton	—	43/9	42/6	47/6	47/6 50/-	—
,, pressed	,,	—	60/-	63/-	60/-	60/- 72/6	—
,, whizzed	,,	—	—	—	70/- 72/6	70/- 75/-	62/6
Anthracene	per unit	-/2	-/1½	-/1½	-/1¼	-/1¼	—

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments Vacant.

GAS ENGINEER (as Representative). No. 5441.
ENGINEER. (Outside erection.) No. 5454.
FOREMAN. Sutherland Meter Company, Birmingham.
DRAUGHTSMAN. West's Gas Improvement Company.

Appointments Wanted.

MANAGER (Portugal, Spain, or South America). No. 5443.
CHEMICAL PLUMBER. No. 5450, c/o Mr. King, 11, Bolt Court, Fleet Street, E.C.

Meetings.

DANISH GAS COMPANY. London Agency. Oct. 26. 2.30 o'clock.
INSTITUTION OF GAS ENGINEERS' PUBLICITY AND GENERAL PURPOSES FUND. Institution of Mechanical Engineers. Oct. 12. Three o'clock.

Plant, &c. (Second-Hand), for Sale.

PURIFIERS, &c. W. J. Jenkins and Co., Retford.

Stocks and Shares.

DORKING GAS COMPANY. By Auction. Oct. 17.

WOKING WATER AND GAS COMPANY. By Auction. Oct. 17.

WORTHING GASLIGHT AND COKE COMPANY. By Auction. Oct. 17.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 17.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.	Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.	£			p.c.				£ s. d.
1,551,868	Stk.	Apl. 12	5	Alliance & Dublin Ord.	81—84	..	5 19 1	200,242	Stk.	Aug. 31	6	Lea Bridge Ord. 5 p.c. .	118—120	..	5 0 0
374,000	Stk.	July 14	4	Do. 4 p.c. Deb.	93—95	..	4 4 3	561,000	Stk.	Aug. 16	10	Liverpool United A. .	212—214	..	4 13 6
250,000	5	Sept. 28	7	Bombay, Ltd. . . .	6—6¼*	..	5 7 8	718,100	,,	,,	7	Do. B. .	162—164	..	4 5 4
50,000	10	Aug. 31	15	Bourne-) 10 p.c. .	28½—29½	..	5 1 8	306,083	,,	June 30	4	Do. Deb. Stk.	102—104	..	3 16 11
311,810	10	,,	7	mouth Gas) B 7 p.c. .	16½—16¾	..	4 3 7	75,000	5	June 15	6	Malta & Mediterranean	4¾—5	..	6 0 0
75,000	10	,,	6	and Water) Pref. 6 p.c.	14¼—14¾	..	4 1 4	560,000	100	Apl. 1	5	Met. of) 5 p.c. Deb.	101—103	..	4 17 1
380,000	Stk.	Aug. 16	13	Brentford Consolidated	256—261	..	4 19 7	250,000	100	,,	4½	Melbourne) 4½ p.c. Deb.	101—103	..	4 7 5
330,000	,,	,,	10	Do. New . . .	198—203	..	4 18 6	541,920	20	May 31	3½	Monte Video, Ltd. . .	12⅝—13¼	..	5 5 8
50,000	,,	,,	5	Do. 5 p.c. Pref. .	120—122	..	4 2 0	1,775,892	Stk.	July 28	4⅝	Newc'tle&G'tesh'd Con.	103—105	..	4 3 4
206,250	,,	June 15	4	Do. 4 p.c. Deb. .	97—99	..	4 0 10	529,705	Stk.	June 30	3½	Do. 3½ p.c. Deb.	87—89	..	3 18 8
220,000	Stk.	Aug. 31	11	Brighton & Hove Orig.	216—221	..	4 19 7	55,940	10	Aug. 31	7/7/0	North Middlesex 7 p.c.	14½—15½	..	4 10 4
246,320	,,	,,	8	Do. A Ord. Stk. .	156—159	..	5 0 8	300,000	Stk.	Apl. 27	8	Oriental, Ltd. . . .	138—140	..	5 14 4
490,000	20	Sept. 28	12	British	44½—45½*	..	5 9 11	60,000	5	Sept. 28	8	Ottoman, Ltd. . . .	6¼—7*	..	5 14 4
120,000	Stk.	June 30	4	Do. 4 p.c. Deb. Stk.	94—96	..	4 3 4	31,800	53	Aug. 16	13	Portsea Island A . .	132—136	..	5 1 0
100,000	,,	Aug. 16	6	Bromley, A 5 p.c. . .	115—120	..	5 0 0	60,000	50	,,	13	Do. B . .	122—125	..	5 4 0
165,700	,,	,,	4½	Do. B 3½ p.c. . .	85—90	..	5 0 0	100,000	50	,,	12	Do. C . .	117—122	..	4 18 4
82,378	,,	,,	5½	Do. C 5 p.c. . .	105—110	..	5 0 0	398,490	5	May 31	8	Primitiva Ord. . . .	7⅞—7⅞	+⅛	5 4 11
55,000	,,	June 30	3½	Do. 3½ p.c. Deb. .	82—84	..	4 3 4	796,980	5	June 30	5	Do. 5 p.c. Pref. .	5⅞—5⅞	..	4 11 11
250,000	Stk.	,,	4	Buenos Ayres 4 p.c. Deb.	95—97	..	4 2 6	488,900	100	June 1	4	Do. 4 p.c. Deb. .	97—99	..	4 0 10
100,000	10	—	—	Cape Town & Dis., Ltd.	2—3	..	—	312,650	Stk.	June 30	4	River Plate 4 p.c. Deb.	95—97	..	4 2 6
100,000	10	—	—	Do. 4½ p.c. Pref. .	4—5	..	—	250,000	5	Sept. 28	12	San Paulo, Ltd. . . .	10¼—11*	..	5 9 1
100,000	Stk.	June 30	4½	Do. 4½ p.c. Deb. Stk.	80—83	..	5 8 5	115,000	10	,,	6	Do. 6 p.c. Pref. .	11⅝—12¼*	..	4 18 0
157,150	Stk.	Aug. 16	5	Chester 5 p.c. Ord. . .	107—109	..	4 11 9	125,000	50	July 1	5	Do. 5 p.c. Deb. .	50—51	..	4 18 0
1,513,280	Stk.	,,	5/9/4	Commercial 4 p.c. Stk.	111—113	—½	4 16 8	135,000	Stk.	Aug. 31	10	Sheffield A	237—239	..	4 3 8
560,000	,,	,,	5½	Do. 3½ p.c. do..	105—107	—½	4 19 8	209,984	,,	,,	10	Do. B	237—239	..	4 3 8
475,000	,,	June 15	3	Do. 3 p.c. Deb. Stk.	76—78	..	3 16 11	523,500	,,	,,	10	Do. C	235—237	..	4 4 5
800,000	Stk.	May 31	4	Continental Union, Ltd.	86—90	..	4 8 11	90,000	10	Sept. 28	6	South African . . .	8—9*	..	6 13 4
200,000	,,	,,	7	Do. 7 p.c. Pref.	135—137	..	5 2 2	6,429,895	Stk.	Aug. 16	5/9/4	South Met., 4 p.c. Ord.	116—118	..	4 12 8
492,270	Stk.	—	5½	Derby Con. Stk. . . .	122—124	..	4 8 9	1,895,445	,,	July 14	3	Do. 3 p.c. Deb.	79—81	+½	3 14 1
55,000	,,	—	4	Do. Deb. Stk. . . .	104—105	..	3 16 2	209,820	Stk.	Aug. 16	8½	South Shields Con. Stk.	150—152	..	5 11 10
840,150	10	July 28	10	European, Ltd. . . .	18¾—19¼	..	5 2 7	605,000	Stk.	,,	5⅝	S'th Suburb'n Ord. 5 p.c.	117½—119½	..	4 14 9
16,160,600	Stk.	Aug. 16	4/14/8	Gas-) 4 p.c. Ord. . .	105½—106½	—½	4 8 10	60,000	,,	,,	5	Do. 5 p.c. Pref. .	115½—117½	..	4 5 1
2,600,000	,,	,,	3½	light) 3½ p.c. max. .	83—85	..	4 2 4	117,058	,,	July 14	5	Do. 5 p.c. Deb. Stk.	121—123	..	4 1 4
4,062,235	,,	,,	4	and) 4 p.c. Con. Pref.	101—103	..	3 17 8	502,310	Stk.	May 12	5	Southampton Ord. . . .	108—110	..	4 10 11
4,531,705	,,	June 15	3	Coke) 3 p.c. Con. Deb.	80—82	+1	3 18 2	120,000	Stk.	Aug. 16	7⅛	Tottenham) A 5 p.c. .	145—148	..	4 16 3
258,740	Stk.	Sept. 14	5	Hastings & St. L. 3½ p.c.	94—96	..	5 4 2	483,940	,,	,,	5⅝	and) B 3½ p.c. .	115—117	..	4 16 1
£2,500	,,	,,	6½	Do. do. 5 p.c.	—	..	—	149,470	,,	June 15	4	Edmonton) 4 p.c. Deb.	96—98	..	4 1 8
70,000	10	Apl. 27	11	Hongkong & China, Ltd.	17⅞—18	..	6 2 2	182,380	10	June 15	8	Tuscan, Ltd.	8⅞—9¼	..	8 13 0
131,000	Stk.	Sept. 14	7½	Ilford A and C . . .	150—153	+3	4 18 0	149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	96—98	..	5 2 0
65,780	,,	,,	6	Do. B	120—123	..	4 17 7	236,476	Stk.	Aug. 16	5	Tynemouth, 5 p.c. max.	113—115	..	4 6 11
65,500	,,	June 30	4	Do. 4 p.c. Deb. . . .	94—96	..	4 3 4	255,636	Stk.	Aug. 31	6⅞	Wands-) B 3½ p.c. .	142—145	..	4 14 10
4,940,000	Stk.	May 12	9	Imperial Continental .	181—184	+1	4 17 10	85,766	,,	June 30	3	worth) 3 p.c. Deb. Stk.	71—73	..	4 2 2
1,235,000	Stk.	Aug. 16	3½	Do. 3½ p.c. Deb. Red.	90—92	..	3 16 1								

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As already announced, a Meeting of the Supporters of the above will be held on

THURSDAY, 12th OCTOBER, 1911,

AT THE

INSTITUTION OF MECHANICAL ENGINEERS,

STOREY'S GATE, ST. JAMES' PARK, WESTMINSTER,

to constitute the Association for administering the Fund, and to transact other business incidental thereto.

The Chair will be taken at 3 p.m. by the President of the Institution, Robt. G. Shadbolt, Esq.

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